SOCIOSPATIAL RELATIONS: THE ROLE OF NEIGHBORHOOD WALKABILITY ON COMMUNITY CURRENCY ACTIVITIES

A Dissertation

by

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ABSTRACT

Communities with higher levels of social capital tend to show lower crime rates, well-realized democracy, and improved economic development through collaboration. Community Currency (CC) has been shown to be an effective form of social capital, the use of which leads to more viable communities. Empirical studies illustrate that CC has positive social, economic, and environmental outcomes.

While CC systems are actively operated in some areas, they are not in others. Understanding the reasons for some CC systems to be more active than others would help us build stronger CC systems. However, the impacts of neighborhood environments (such as walkability) on CC remains unexplored. Examining the attributes of neighborhood environments in areas where CC programs actively operate will help replicate their success. Such findings will help communities become more livable.

The present exploratory study examined how the characteristics of the neighborhood environment influenced the levels of CC activities, community attachment, and quality of life for individuals who do, and do not, use CC. Both quantitative and qualitative data were collected throughout a network of ten cities in northeast Ohio that use a single common CC system. After controlling for demographic factors, the analysis showed that several characteristics of neighborhood environments (e.g., *destination accessibility* and *place dependence*) were positively related to the incidence of CC membership and the levels of CC member activity. Based on these results, it is suggested that CC organizations actively recruit members in highly walkable

areas where diverse amenities are concentrated, particularly given that CC members showed higher levels of community attachment and quality of life compared to nonmembers.

In sum, findings of this study can help CC organizations identify ways to increase participation in CC programs. Also, policymakers, planners, and designers may apply CC as an asset-based development approach to their work and improve their physical neighborhood environments by including more walkable areas, which can increase the social and economic vitality of communities through more sociable neighborhood environments.

DEDICATION

I sincerely dedicate this dissertation to my Lord, Jesus Christ;

He restores my soul and leads me in paths of righteousness for his name's sake;

He instructs me and teaches me in the way I should go;

He counsels me with His loving eye upon me.

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NOMENCLATURE

ABCD	Asset-Based Community Development
BLUEs	Best Linear Unbiased Estimators
CC	Community Currency
CFA	Confirmatory Factor Analyses
CFI	Comparative Fit Index
CRAT	Crooked River Alliance of TimeBanks
LETS	Local Exchange Trading System
OLS	Ordinary Least Squares
RMSEA	Root Mean Square Error of Approximation
SMO	Social Movement Organization
TC	Time Credits
TLI	Tucker-Lewis index

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1. INTRODUCTION

1.1. BACKGROUND

A growing body of research has found that social ties and community engagement positively influence mental and physical health by increasing quality of life for both individuals and communities (Jacob, Brinkerhoff, Jovic, & Wheatley, 2004; Leyden, 2003; R. Putnam, 2000). Individuals who are socially connected with others and participate in community activities are generally happier and enjoy greater longevity of life (Ballas, 2013; Leyden, Goldberg, & Duval, 2011; Leyden, Goldberg, & Michelbach, 2011; R. Putnam, 2000). Communities with higher levels of social connections tend to show lower crime rates, well-realized democracy, and improved economic development through collaboration among community members (R. Putnam, 2000). These social and community connections are essential components of social capital. Social capital, according to Putnam (1995), refers to the ways communities enhance social efficiency through the concepts of good will, trust, networks, and reciprocity.

Social capital can be generated and regenerated through the implementation and use of Community Currency (CC) (Jacob et al., 2004; Wheatley, Younie, Alajlan, & McFarlane, 2011). CC – an asset-based currency – is a tool for sustainable community development (Collom, 2005). Especially following the recent economic crisis in 2008, the use of CC has rapidly grown all over the world (Community Currency Knowledge Gateway, 2016). Empirical studies have illustrated that CC has positive social, economic, and environmental outcomes. Socially, CC has been shown to reduce social

exclusion and boost active citizenship (Longhurst & Seyfang, 2011; Seyfang, 2000; Seyfang, 2001; Seyfang, 2002; Seyfang & Longhurst, 2013; Slay, 2011; Wheatley et al., 2011). Similarly, CC has positive economic impacts such as reducing poverty and improving local economies (Jacob et al., 2004; Seyfang, 2001; Seyfang & Longhurst, 2013; Slay, 2011; Wheatley et al., 2011). Environmentally, CC has been shown to promote sustainable consumption (Seyfang & Longhurst, 2013; Slay, 2011).

CC is different from national currency in two ways. First, unlike national currencies, CC is circulated only in limited geographic areas (Pacione, 2011). Second, CC cannot be lent for the purpose of creating interest because CC has no interest rates, which leads to decreasing the storage function of money while increasing the exchange function (Pacione, 2011; Primavera, 2010). Also, CC can generally be designed in two ways: printed vouchers (e.g., Ithaca HOURS) or digital credits (e.g., Local Exchange Trading System [LETS] and Time Banking) (Slay, 2011). Printed vouchers look like, and are used in a manner similar to, general national currency. Meanwhile, digital currency is recorded only to a users' individual online account.

CC is developed based on the concepts of social exchange and co-production (Cahn, 2006; Jacobsohn, 2014). In social exchange theory, the basic nature of human social behavior is reciprocal, both sides perceive benefits from a given interaction (Cook, Cheshire, Rice, & Nakagawa, 2013; Molm & Cook, 1995; Ring, 1996; Takahashi, 2000). In co-production theory, community members are involved in developing public services as partners (Marks, 2012). These concepts of social exchange and co-production encourage giving back to members (Cahn, 2006). Via CC initiatives,

community members can exchange goods and services that are either available or unavailable on the general market (Jacob et al., 2004; Wheatley, 2006; Wheatley et al., 2011).

Some research has pointed to CC's ability to improve efficiency at the community level, by reducing bureaucratic inefficiencies in the local economic system (Longhurst & Seyfang, 2011; Seyfang, 2001; Slay, 2011). However, in the present study, I focus on individual benefits of CC. Through CC programs, community members can be recipients and providers of services simultaneously (Gomez & Helmsing, 2008; Primavera, 2010). This duality creates and encourages a sense of belonging and self-efficacy (Collom, Lasker, & Kyriacou, 2012; Jacob et al., 2004; Lasker et al., 2011; Slay, 2011). As for Time Banking systems, the basic unit of value is time regardless of the work activities completed. For instance, a dentist can provide an hour of care to an elderly woman. This lady could then pay for her care using a credit earned babysitting for a single parent for one hour. Likewise, any individual, organization, or business can be involved in CC, sharing their time, skills, assets, and energies (Bellotti et al., 2014; Collom et al., 2012; A. C. Cooper, Gimeno-Gascon, & Woo, 1994; Della Peruta & Torre, 2015; Gomez & Helmsing, 2008; Lasker et al., 2011; North & Unit, 2000).

Yet, CC systems flourish in some places but not in others. One reason is that both human behavior and community viability are influenced by the physical environment (B. B. Knudsen & Clark, 2013; Lewicka, 2011; Leyden, 2003; Mehta & Bosson, 2010; Najafi, 2011; Raymond, Brown, & Weber, 2010; Wood & Giles-Corti, 2008; Wood, Frank, & Giles-Corti, 2010). Further, growing research has found that physical

environments can positively or negatively influence social environments through such variables as social interaction and community cohesion (Leyden, 2003; Lund, 2002; Lund, 2003; Zhu, Yu, Lee, Lu, & Mann, 2014). Thus, differences in physical environments would have an effect on CC activities in terms of actual human social behavior.

Particularly, new urbanists argue that more walkable neighborhoods (e.g., having well-connected streets, diverse facilities, dense amenities, and mixed-use design) can promote a sense of community and social capital (Leyden, 2003; Lund, 2002; Lund, 2003; Zhu et al., 2014). For instance, Zhu et al. (2014) indicated that residents who moved to a more walkable community showed increased social interaction and cohesion, compared to their previous community. Also, other scholars (Du Toit, Cerin, Leslie, & Owen, 2007; Wood & Giles-Corti, 2008) have noted that neighborhood walkability has a positive correlation with a sense of community and social capital. Knudsen and Clark (2013) illustrated that street connectivity, facility density, and general walkability positively influenced the occurrence of social movement organizations (SMOs), which focus on social, environmental, and/or human rights advancement work. However, Jun and Hur (2015) found contradictory empirical results. These results demonstrated that perceived walkability[1] improved respondent's sense of their neighborhood's social environment, whereas objective walkability[2] did not. These contradictory findings point

[1] Subjective data collection methods (surveys) were used.
[2] Objective measures (GIS) were used.

to the complex nature of relationships between individuals' perceptions of their physical neighborhood environments and their actual social behavior.

Nonetheless, despite growing research contrasting neighborhood differentiation in social environments, research on the effect of the physical environment on CC activities has been limited. Community development researchers need to investigate the effects of physical environments upon CC activities. Such research might lead to more socially, economically, and environmentally livable communities.

1.2. OBJECTIVES

The present exploratory study examined how the characteristics of the neighborhood environment influence the levels of CC activities, community attachment, and quality of life for individuals who do, or do not, use CC. Specifically, this study examined obstacles to, and catalysts for, CC activities relating to neighborhood walkability. The study was conducted in a community that had implemented a Time Banking system form of CC (Crooked River Alliance of TimeBanks) located in northeast Ohio, which has operated since 2010.

The present research is guided by the following questions: What is the role of walkable neighborhood environments in improving residents' participation in CC activities and community attachment? What is the association between CC activities and residents' community attachment and quality of life? What is the relationship between the socioeconomic status and demographic characteristics of the residents, CC membership, community attachment, and quality of life?

This study hypothesized that the components of the physical environments that enhance objectively and subjectively measured walkability, such as *destination accessibility*, would be positively associated with the occurrence of CC membership, the levels of members' CC activities, and community attachment, because actual social and community behavior are a stronger form of language influenced by physical environments.

Furthermore, the present study hypothesizes that higher levels of both CC activities and satisfaction with CC are related to community attachment and quality of life. The resulting increased social interaction and community activities could improve individual community attachment and quality of life.

Lastly, CC membership, higher levels of community attachment, and increased socioeconomic status are positively correlated with quality of life. The main aims of this dissertation were to examine the relationships between the following independent variables:

(1) Objective/subjective neighborhood environments[3], the incidence of CC membership, and the levels[4] of members' CC activities.

(2) CC activities and satisfaction, community attachment[5] and quality of life[6].

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[3] Objectively measured walkability at the individual level (i.e., Walk Score, *destination accessibility* from home), subjectively measured walkability (i.e., perceived *accessibility to services* and *comforts in walking*), subjectively measured environmental perception (i.e., *safety from crime* and *place dependence*), and usage of social activity places (i.e., *third places*). Variable names appear in italics.

[4] i.e., *participation in CC events, number of kinds of goods and services to be exchanged with CC, average number of exchanges,* and *number of transaction partners*.

[5] i.e., *neighborhood cohesion, community support,* and *local shopping loyalty*

[6] i.e., *physical and material well-being, relations with other people, social/community/civic activities, personal development and fulfillment,* and *recreation*.

(3) Objective/subjective neighborhood environments and community attachment.

(4) Demographic factors, CC membership, community attachment, and quality of life.

1.3. SIGNIFICANCE

Social and community engagement facilitates individual happiness as well as public health. One efficient and novel way to boost social involvement among residents is the CC program. If community development researchers explore the factors that encourage CC programs, local communities could employ CC more effectively to provide social services and fill the needs of the residents as a complimentary vehicle for sustainable community development. Such a program might lower the financial burden for communities to fund social programming.

Although literature on the impacts of CC is rich, there is a lack of research providing a better understanding of how to boost CC membership. Even though introducing CC programs to communities is a small change, it has the potential to make big differences in the lives of community members. In this respect, the present study is one of the first attempts to investigate the relationships between neighborhood environments, CC participation levels, and member activities. The current study offers valuable insights to two groups. For CC organizations, it suggests effective methods of promoting CC systems in their respective communities. For urban planners, it offers insights into the extent to which CC and neighborhood walkability might promote community members' quality of life and community attachment directly or indirectly.

Another major contribution is that the present study includes data of both CC users and nonusers. The impact of neighborhood environments – particularly neighborhood walkability – on the incidence of CC membership and the levels of CC member activities can only be fully understood when CC nonusers are included. Most previous research focused solely on the social and economic impacts of CC among users, without including nonusers. Thus, the current research can provide a better understanding of the predictors that attract people to become CC members and the impacts of CC membership on community attachment and quality of life. Furthermore, the current study, which employed multi-categorical constructs of community attachment and quality of life, provides a more comprehensive picture of the impacts of neighborhood environments and CC activities.

Finally, the present study will be to support policymakers or shareholders with data and strategies which can be used to enhance their local vitality and community involvement. Neighborhood design alone cannot be a panacea for boosting social capital and community engagement. If the findings of this study are applied to physical neighborhood design, community members' physical, emotional, and mental well-being may be improved, thereby supporting long-term growth of community prosperity.

1.4. DISSERTATION OUTLINE

This dissertation investigates the impact of neighborhood environments on Community Currency (CC) participation, CC activities, and community attachment. It also examines the potential benefits of CC membership and activities on community

attachment and quality of life. Chapter 1 introduces the background of the study and research objectives. Chapter 2 provides a review of interlocking theories and the existing literature relevant to this research. In the sub-chapter discussing the interlocking theories within chapter 2, the current study reviews theories of social exchange and social capital. In addition, the review of literature includes the concept and benefits of CC, associations between physical and social neighborhood environments, and possible determinants of quality of life. Chapter 3 includes the conceptual framework, research hypotheses, and research design. It also specifies the research setting and sample frame, study participants and the recruitment process, and the methodology employed for assessing the hypotheses. Chapter 4 reports the descriptive results and illustrates the outcomes of hypothesis testing. Finally, chapter 5 discusses the significance of findings of the study.

2. LITERATURE REVIEW

This section introduces literature related to this study and includes interlocking theories. This review of literature has the following order: (1) introduction of Community Currency (CC); (2) interlocking theories; (3) benefits of CC; and (4) factors influencing CC participation. This section also describes interlocking theories, including the two main areas of sociology – social exchange and social capital theory. Social exchange theory is represented in relation to the essential character of reciprocity within Community Currency (CC) systems. Social capital theory shows the advantages of social exchange and social interaction amongst individuals and communities via social networks (Miller, 2008). Thus, links between the two theories exist.

2.1. COMMUNITY CURRENCY

2.1.1. Introduction

A Community Currency (CC) program is the typical example of the asset-based community development (ABCD) model. Asset-based community (-driven) development (ABCD) pursues the aim of "from clients to citizens" in order to respond to global changes in the social, political and economic environment (Cunningham & Mathie, 2002; Mathie & Cunningham, 2003). ABCD asserts communities themselves can drive the development process by recognizing and animating existing – but, sometimes idle – assets such as personal talents/skills, and social capital via social affinity and networks, while developing local economic opportunities (Cunningham &

Mathie, 2002; Mathie & Cunningham, 2003; Mathie & Cunningham, 2005). Accordingly, the ABCD model has been employed for sustainable community-driven development to enable the excluded to be involved in the local economy, instead of just beneficiaries (Table 1). CC as an ABCD tool, has been considered as one of the effective ways for local communities to handle the globalization of capitalism or the hyper-mobility of money (Pacione, 2011; Primavera, 2010). By creating and circulating local CCs, communities can enhance both local autonomy and their social safety nets against the global economy (Nakazato & Hiramoto, 2012; Pacione, 2011; Primavera, 2010).

Table 1

Types of Sustainable Community Movement Organizations

		Attitude towards consumption	
		Alter-Consumerism	Anti-Consumerism
Scale of action	Global	• Fair trade • Specific no-sweat groups (e.g., United Students Against Sweatshops)	• Group promoting de-growth (e.g., the casseurs de pub) • Simplicity movement
	Local	• Community-sustained agriculture • Community Food Networks • Slow Food	• Community Currency • Transition Towns • Ecovillages

Source: Forno, & Graziano, 2014, p. 16

CC, one of the sustainable grassroots community movements, is money that intentionally weakens the storage function (Collom, 2005; Collom et al., 2012; Lasker et al., 2011). It is very different from national fiat money (e.g., U.S. dollars, Euro, etc.) in terms of zero nominal interest and a limited-area circulation (Pacione, 2011; Primavera, 2010). Currently, more than 6,500 CC systems have been operated worldwide

(Community Currency Knowledge Gateway, 2016). Moreover, their usage has grown dramatically since the 2008 financial crisis (Community Currency Knowledge Gateway, 2016). There has also been an increase in evidence that CC has sustainable development benefits such as encouraging local economies, boosting economic localization, assessing marginalized labor, facilitating equitable working structures, expanding access to financial services, improving social capital and cohesion, empowering active citizenship, and allowing cooperative consumption to decrease environmental impacts of current standards of living (Collom, 2005; Collom, 2011; Collom et al., 2012; Nakazato & Hiramoto, 2012; Richey, 2007; Slay, 2011; Wheatley et al., 2011).

Specifically, CC is often called a vehicle for alleviating the problems caused by unemployment or insecure employment, through providing learning opportunities and improving members' skills to prepare and upgrade their employability in the regular job market (Della Peruta & Torre, 2015; Gomez & Helmsing, 2008). Findings from the study by Gomez and Helmsing (2008) indicated CC's long-lasting effects on "women's empowerment, acquisition of skills, and micro-enterprise creation" by redeploying unused skills and competencies, which allows diversification in income sources of the households that would otherwise fall into a cycle of poverty.

CC systems mainly aim to enable communities to exercise their own control over money circulation and their local economies. They also allow community members' personal skills and resources to be rediscovered and circulated within the community (Jacob et al., 2004; Nakazato & Hiramoto, 2012; Primavera, 2010). In the current global economic system, money flows into the community from external sources; however,

through the purchase of goods and services, part of the currency flows back out of the community (Pacione, 2011). Juxtaposed to this notion, through CC, community resources are maintained within, and by, the community; the goods and services are exchanged only within the community, and the local community's ultimate resources, level of productivity, and community members' creativity are not limited by a lack of money (Jacob et al., 2004; Pacione, 2011; Primavera, 2010). Also, community members in their own way can participate in the local economy through CC; they are able to see how their own interests and skills can be a gift to other community members. Without this knowledge, they may fail to find themselves having a voice within the community (Wheatley et al., 2011). As a result, CC values people over profits and is not dominated by scarcity. The unemployed, disabled, elderly, and socially disadvantaged all may have opportunities for employment and ways to restore their own confidence (Collom, 2011; Collom et al., 2012; Lasker et al., 2011; Slay, 2011; Wheatley et al., 2011).

CC systems, however, face several challenges in terms of administration, recruitment, participation, and longevity (Collom et al., 2012). For administration, substantial resources are generally required to launch as well as sustain CC programs; additionally, monitoring the members' activities can be difficult (Collom et al., 2012). For recruitment, CC staffers sometimes have difficulty selling the concept of CC and framing recruitment rules and methods (Collom et al., 2012). In addition, increasing members' participation takes more exertion and demands trust among members (Collom et al., 2012). Some members struggle to request their demands because they feel more comfortable giving than receiving (Collom et al., 2012). The supply and demand could

also be imbalanced (Collom et al., 2012). Furthermore, most of systems do not survive more than five years (Collom et al., 2012). Therefore, when the CC systems solve these problems, they have the potential to flourish. While CC cannot entirely isolate the local economy from the negative effects of globalization, it can protect to some degree against the spatially-indifferent often deleterious effects of the international financial system, stimulating the social and economic revival of a community (Collom et al., 2012; Lasker et al., 2011; Pacione, 2011; Primavera, 2010; Slay, 2011).

2.1.2. Typologies

Forms and operations of community currencies (CC) vary greatly depending on the purposes and circumstances. CC can generally be designed in two ways: printed vouchers (e.g., BerkShares and Ithaca HOURS) or digital credits (e.g., Local Exchange Trading System [LETS] and Time Banking) (Slay, 2011; Steed & Bindewald, 2015). Printed vouchers are used in a similar way to general fiat money. On the other hand, a form of digital credit (credits or debits) is recorded into a user's online account in a similar way to a personal online bank account.

2.1.2.1. Examples of Printed Vouchers

BerkShares

BerkShares are a local currency employed in the Berkshire region of Massachusetts.[7] BerkShares are circulated among individual members and expended

[7] It was started on September 29, 2006 by BerkShares Inc., with assistance from the Schumacher Center

into local businesses as money. These businesses must be enrolled as members of the BerkShares program. The functioning of BerkShares is similar to gift certificates (Greco, 2002). Residents can purchase the certificates with cash (federal national currency) at a small discount, and then those certificates can be redeemed through transactions with businesses. Tracking information is rarely available in every transaction and those transactions can occur in limited places (Greco, 2002). Today, BerkShares can be purchased at eight branch offices of three local banks and can be used at 400 local businesses (BerkShares, 2016a). Like gift certificates, earned income with BerkShares is taxable (BerkShares, 2016a). BerkShares aim to promote local economic activity, increase local economic multiplier effects, and keep capital recirculating in their specific regions, serving as an engine for community economic empowerment (BerkShares, 2016a).

Ithaca HOURS

The Ithaca HOURS, a local currency employed in Ithaca, New York, is the oldest[8] and one of the most successful Community Currency systems in the U.S. (Greco, 2002). The goal of Ithaca HOURS is to have "control of the social and environmental effects (social justice and ecological sustainability) of commerce by issuing over $110,000 of their own local paper money" (Ithaca HOURS, 2016). One Ithaca HOUR is worth the same as $10 (US), which is the average wage per hour in Tompkins County

for New Economics (BerkShares, 2016b).

[8] It was launched by Paul Glover in November 1991 (Ithaca HOURS, 2016)

(Ithaca HOURS, 2016). It is typically paid for one hour's work regardless of the characteristics of the work (e.g., child care vs. legal services), even though the payment rate is negotiable (Ithaca HOURS, 2016). Ithaca HOURS are issued in various ways[9] such as payments to those who register as a new member. They are taxable income to the professional business trading goods and services (Ithaca HOURS, 2016).

Ithaca HOURS seeks to support collaboration[10] among retail and service providers, consumers, and non-profit organizations (Ithaca HOURS, 2016). Members can spend HOURS at over 300 businesses (Ithaca HOURS, 2016). Furthermore, they can pay rent as well as mortgages and loan fees at a credit union with Ithaca HOURS (Ithaca HOURS, 2016). New entrepreneurial ventures can be capitalized with HOUR loans without interest charges (Ithaca HOURS, 2016).

[9] The means of issuance of *HOURS* is various (Greco, 2002, p. 97): "(1) they are issued as payment to those who agree to be listed in *HOUR Town* (the newspaper): one or two HOURS per person/business; (2) every eight months participants may receive a small bonus payment of HOURS for reaffirming their participation; (3) those who signed up or renew at a barter potluck receive an additional one HOUR bonus; (4) as well, 14% of HOURS are issued as grants to community organizations (till 2001, 46 such groups have received HOUR grants); (5) 10% of HOURS otherwise issued may be outstanding as loans. The largest loan is 120 HOURS (US $1,200). 25% of the value of loans repaid are added to the grant capacity; and (6) 5% of HOURS may be issued to the system itself, as for printing *HOUR Town*, HOURS, bumper stickers, office suppliers, etc. No HOURS are issued for staff time."

[10] Benefits of Ithaca HOURS are (Ithaca HOURS, 2016): "(1) to expand the local money supply; (2) to promote and expand local shopping, with an endless multiplier; (3) to double the local minimum wage to $10.00, benefitting not only workers but businesses as well, who find new and loyal customers; (4) to enable shoppers to afford premium prices for locally-crafted goods and for locally-grown organic food; (5) to help start new businesses and jobs; (6) to reduce dependence on imports and transport fuels; (7) to make grants to nonprofit community organizations; (7) to make zero-interest loans; and (8) to stimulate community pride."

2.1.2.2. Examples of Digital Credits

LETS (Local Exchange Trading System)

LETS, an acronym of "Local Exchange Trading System," is a community exchange system. In some areas, it is also referred to as "Local Employment Trading System" or "Local Energy Transfer System" (Greco, 2002). LETS is the most well-known example of a community-based mutual credit system (Greco, 2002). It was created in 1983 by Michael Linton (a Scottish engineer) living in British Columbia, where the local economy fell into a severe recession due to local factory closures (Greco, 2002). The number of unemployed people increased, many residents had to rely on public assistance, and residents' purchasing power was decreased, even though natural resources, individual skills/talents, and demands for goods and services existed; even with these things, money was scarce, which led to a restriction of exchanges between people (Greco, 2002). Linton sought to revive the local economy and empower residents via devising interest-free (inflation-free) money circulated only within the community, in order to complement the scarce national currency (Greco, 2002).

Members of LETS can transact goods/services employing Community Currency (a locally restricted medium of exchange), generally pegged to a national currency (e.g., US dollar) (Linton & Soutar, 1994; Zelizer & Tilly, 2006). Participants usually pay a small membership fee and subscribe to a directory of offers and needs (Zelizer & Tilly, 2006). Each member can communicate to each other as a buyer or seller and negotiate a price for items, and then their transactions are reported to their local LETS office by telephone or mail and recorded to their computer-based central accounts (Zelizer &

Tilly, 2006). Like a checking account, a buyer's account is debited (reduced) and a seller's account is credited (increased) (Greco, 2002). The income from providing professional services or selling goods with payment for LETS units is taxable (Eleni, George, & Dimitris, 2013).

After LETS was established, it expanded quickly, particularly in Australia, New Zealand, and the United Kingdom, as a community credit movement (Greco, 2002). Currently, LETS has been considerably supported by academia and governments (Greco, 2002).

Time Banking Exchange Systems

Time Banking is a time-based currency, invented by Edgar Cahn in the U.S. in the late 1980s. Time Banking systems operate across the globe today – 22 countries across six continents (Marks, 2012). Time Banking systems are exchange based systems wherein people can give and receive goods and services while creating local friendship ties and social networks. Time Banking usually emerges in specific neighborhoods and/or communities as a "neighbor-to-neighbor" or "person-to-person" exchange system, and it has also been applied to community support programs such as elderly care, child welfare, teen courts, prisoner reentry, and local small businesses (Jacobsohn, 2014; Lasker et al., 2011).

Time Banking is based on Cahn's co-production theory. Cahn's main idea of co-production for Time Banking pursues the generation of a shared vision of social justice and energizing of local communities: "(1) an asset perspective (each one of us has

strength); (2) honoring real work (the work the market fails to value); (3) reciprocity (empowering the recipient); (4) community (acknowledging our interdependence); and (5) respect (each voice is owed a listening)" (Cahn, 2006, p. 9). The co-production ultimately aims to foster and sustain client engagement in social service programs. In co-production theory, the recipients are considered as partners in the processes of service planning and execution to improve program outcomes and strengthen local communities (Marks, 2012).

Source: http://community.timebanks.org/

Figure 1

Locations of Time Banking Systems in the U.S.

Time Banking maintains participants because of economic, ideological, social, and altruistic motivations (Collom, 2011; Collom et al., 2012; Lasker et al., 2011) and works so that each hour spent helping another member equals a time credit (or time dollar, hour, or share) recorded into a Time Banking online account. All work has the

same value per hour. For instance, if a member provides an hour of service (e.g., child-care, dog-walking, dentistry, etc.), one time dollar is rewarded to the provider's account from the receiver's account. The recipient can also be a third-party provider to another, which is the "pay-it-forward" model that differs from bartering (mutual exchange of goods and services without using money). Typically, Time Banking systems allow an exchange between the provider and the receiver, A and B respectively. However, this model creates exchanges between A and B, as well as a third party, C. The Time Banking system encourages debts over credits to promote the flow of Time Banking currency, and its ultimate goal is an optimal net zero balance (no credits or debts) (Jacobsohn, 2014). Income from Time Banking systems with payments for time credits is not taxable (Jacobsohn, 2014). Local charities and small businesses are commonly recruited to enrich the variety of goods and services exchanged in the system (Marks, 2012).

2.2. INTERLOCKING THEORIES SUPPORTING COMMUNITY CURRENCY

2.2.1. Social Exchange Theory

2.2.1.1. Introduction

According to the social exchange theory, all human social behavior can be regarded as the exchange of rewards (Cook & Rice, 2003). These rewards are not only economic and material rewards but also psychological and social rewards such as pleasure, respect, love, etc. (Cook & Rice, 2003; Emerson, 1976; Homans, 1958;

Mashima & Takahashi, 2008; Molm, 2010). Many sociologists have pointed out the importance of this exchange as a crucial form of social interaction (Cook & Rice, 2003; Emerson, 1976; Mashima & Takahashi, 2008; Molm, 2010; Takahashi, 2000).

Social exchange is different from economic exchange (Cook & Rice, 2003; Emerson, 1976; Mashima & Takahashi, 2008; Ring, 1996). The social exchange theory's main proposition is that reciprocity is the fundamental characteristic of social interaction (Cook & Rice, 2003; Ring, 1996; Takahashi, 2000). Social exchange is a relationship in which someone has a sense of duty to return benefits, such as compensation received from another party, in the future (Mashima & Takahashi, 2008; Takahashi, 2000).

On the other hand, the economic exchange is objective and observable in most cases, since it is based on the transaction of goods and services (Cook & Rice, 2003; Mashima & Takahashi, 2008; Takahashi, 2000). Both parties in the economic exchange relationship share the understanding of the substance of the exchange and also the exchange time is explicitly set (Cook & Rice, 2003; Mashima & Takahashi, 2008; Takahashi, 2000). However, in social exchange, the rewards for the benefits received are not specifically and clearly settled (Cook & Rice, 2003; Mashima & Takahashi, 2008; Takahashi, 2000). While economic exchange is based on the transaction, social exchange is established on mutual trust and forms the expectation that the party who receives the benefits will pay the rewards relative to the amount he/she takes in their next social interaction (Mashima & Takahashi, 2008; Takahashi, 2000). Because of these characteristics, the parties in a social exchange construct fairness through the

evaluation of mutual trust (Cook & Rice, 2003; Mashima & Takahashi, 2008; Takahashi, 2000).

The social exchange theory mainly assumes that the actors are self-interested and will maximize benefit and minimize cost (Lawler, 2001; Molm, 2010). Homans (1974) explained that people interact through relationships, which can be a factor to strengthen or restrain the other party's response through the process of interaction, suggesting "Profit = Reward – Cost" (Homans, 1974). Specifically, Homans suggested five propositions summarizing key characteristics of social exchange. First, the success proposition asserts that if someone's action brings a positive reward, he/she is likely to repeat the act. Second, the stimulus proposition describes that if a particular stimulus led to rewards in the past, he/she easily tends to react to it. Third, the deprivation-satiation proposition states that if someone frequently receives any special rewards from others, the rewards of the marginal utility become less valuable. Fourth, the value proposition states that if rewards from others for one's action are more valuable to himself/herself than other rewards, he/she is more likely to do the action. Fifth, the rationality proposition indicates that when people choose between alternative behaviors, people are more likely to adopt one which has a higher probability of receiving more rewards (Cook & Rice, 2003; Emerson, 1976; Homans, 1974).

2.2.1.2. Types of Social Exchange

There are four types of social exchange: (1) productive exchange (actor-to-group), cooperating efforts or integrating resources to produce a shared good; (2)

negotiated exchange (actor-to-actor), bargaining a clear agreement on the terms and conditions of trade; (3) reciprocal exchange (actor-to-actor direct exchange), exhibiting delayed exchange, such as a gift exchange between two people with no expectation of reward; and (4) generalized exchange (actor-to-actor indirect exchange, also known as generalized reciprocity or indirect reciprocity), giving unilateral favor to some actor or a member of a group or network while receiving benefits from other members (Lawler, 2001; Molm, 2003; Molm, Collett, & Schaefer, 2007; Molm, 2008; Molm, 2010).

First, in productive exchange, both the actors must provide a benefit to the other party for a common goal (Emerson, 1976; Lawler, 2001). The costs and benefits for the two participants take place at the same time (Emerson, 1976; Lawler, 2001). Second, negotiation exchange concentrates on the negotiation rules that benefit both sides by a mutual binding or non-binding agreement of a trade (i.e., economic exchange) (Lawler, 2001; Molm et al., 2007). Third, reciprocal exchange includes continuous, non-negotiated, one-sided benefits to be granted with no definite expectation of reciprocal rewards between two participants (e.g., invitations to dinner) (Lawler, 2001; Molm, 2010). Each participant's contribution to another is distinguished by the reaction time difference between providing and receiving (Lawler, 2001; Molm, 2010). Reciprocal exchanges produce a high standard of trust and commitment to the trading partner with the uncertainty (Lawler, 2001; Molm, 2010). Finally, generalized exchange needs at least three participants, including indirect exchange. For instance, among four individuals, A gives benefit to B, B gives it to C or D, and C gives it to D or A; that is,

each giving-receiving related partner is different in generalized exchange (Lawler, 2001; Molm, 2010).

The most relevant type of social exchange to CC activities is generalized exchange. In generalized exchanges, transactions are not necessarily immediately reciprocal (Baker & Levine, 2010). Generalized exchanges are common attributes of enterprises, large organizations, neighborhoods, small groups, specialist groups, and the online communities in complicated contemporary societies (Baker & Levine, 2010; Molm, 2010). Generalized exchanges yield stronger consolidative bonds, greater trust, emotional affection, and solidarity than other direct exchange forms, which are key factors of organizations, corporations, urban neighborhoods, local communities, and social capital (Baker & Levine, 2010; Molm, 2010). According to Takahashi (2000), for generalized exchange appearance, "norms, contracts, or altruism" are not necessary if actors recognize their own fairness, and can access information of other parties' past actions and reputation, which can be used to choose or refuse possible recipients. Generalized exchanges have been known to contribute to social order, solidarity, affection, cooperation, morality, altruism, and the emergence of language (Baker & Levine, 2010; Lawler, 2001; Molm et al., 2007; Molm, Schaefer, & Collett, 2007; Molm, 2010). Likewise, we can understand the CC activities based on the generalized exchanges.

2.2.1.3. Social Exchange and Community Currency

The social exchange theory, especially as regards direct and generalized reciprocity, is helpful for understanding the process of CC system members' actions and the impacts of CC members' activities on socio-economic community attachment and their subjective well-being. Through participating in a CC system, members can earn intrinsic or extrinsic rewards in exchange for tangible or intangible goods and/or services. Such systems also create cohesiveness between members (Homans, 1958). This cohesiveness leads people to participate in a group (Homans, 1958), and form a shared social identity, enhancing community attachment (Bergami & Bagozzi, 2000; Haslam, Jetten, Postmes, & Haslam, 2009). Shared social identities assume that group members have similarities to other participants in the group, and that they have a commitment to take action with the standards of the group (Bergami & Bagozzi, 2000; Haslam et al., 2009; Stets & Burke, 2000). Likewise, CC members exchange their own goods and/or services with CC in line with the norms of CC systems. Shared social identity through social exchange increases a sense of belonging/community, boosts commitment to the group, and enhances social capital, which is promoted through social networks (Bergami & Bagozzi, 2000; Haslam et al., 2009; Lin & Kede, 2011). In turn, increased social capital raises group cohesiveness and social identity, which could enhance members' sense of their value within, and to, their community. This shared social identity also has an impact on the mental and physical health of the CC members (Elgar et al., 2011; Haslam et al., 2009; Myers & Diener, 1995).

This study was based on the social exchange theory, and formulated upon the study of selected variables that characterize CC activities. These variables include: participation in CC events, number of goods/services exchanged, transaction frequency, number of trading partners, etc.

2.2.2. Social Capital

2.2.2.1. Introduction

According to the World Bank (1999), social capital can be defined as "the institutions, relationships, and norms that shape the quality and quantity of a society's social interactions; social capital is not just the sum of the institutions which underpin a society – it is the glue that holds them together." The social capital theory came to prominence in the late 1980s through systematic discussions, long after the social capital theory was introduced by Hanifan in 1916 (Hanifan, 1916; R. Putnam, 2000). Social capital that can be increased by social exchanges has been applied in a variety of academic fields such as public administration, social work, business administration, urban planning studies, and tourism (Baum & Palmer, 2002; Cattell, 2001; J. S. Coleman, 1988; Cook, 2005; Elgar et al., 2011; Glaeser, Laibson, & Sacerdote, 2002; Glaeser & Redlick, 2009; Leyden, 2003; Lin & Kede, 2011; Portes, 2000; R. Putnam, 2000; Rose, 2000; Westlund & Adam, 2010; Willmott, 1986). Therefore, its range of concept is very wide and comprehensive, and the unit of analysis is different based on the research interests, which indicates limitations with the diversity of social capital's definition (J. S. Coleman, 1988; Cook, 2005; R. Putnam, 2000).

The first systematic discussion of social capital was initiated by Bourdieu and Coleman (Bourdieu, 1986; J. S. Coleman, 1988; Mathie & Cunningham, 2005). Bourdieu (1986) defined social capital as it is related to the existence of a network where mutual acquaintance and recognition are continuous and institutionalized (i.e., membership in a particular group). The institutionalized network guarantees the granting credit to members in the form of trust. Coleman (1993) emphasized the concentrated social network which helps to achieve a particular purpose, focusing on the function of social capital. Based on Coleman's theory, Putnam extended the concept from the individual or family level of social capital into the political and cultural area (R. Putnam, 2000). Putnam stated social capital is an umbrella term of organizations to improve social efficiency by promoting collaborative activities consisting of trust, norms, or networks, based on reciprocity (R. D. Putnam, 1995).

Social capital is also a spatial concept. Social capital diminishes social distance, which can produce essential elements of vital society, such as trust, loyalty, altruism, and cooperation (Glaeser et al., 2002). If spatial proximity is close in neighborhoods, social connections are more actively made (Glaeser et al., 2002; R. Putnam, 2000). Likewise, social capital accumulation is influenced by a community's social, cultural and physical infrastructure. In this context, social capital has similar aspects of a sense of place even though it is not constrained by place; it plays a vital role as a mediator in the relationship between a sense of place and the grassroots community movement (Baum & Palmer, 2002; Wood & Giles-Corti, 2008). In addition, a neighborhood that is more walkable and with a well-connected street network design tends to stimulate and develop

community engagement, communication among neighbors, and social capital (Wood & Giles-Corti, 2008). Opportunities for informal, spontaneous, or casual encounters while walking are favorable to social capital creation (Baum & Palmer, 2002; Cattell, 2001).

2.2.2.2. Types of Social Capital

Putnam (2000) depicted social capital is composed of two elements: bonding and bridging capital (R. Putnam, 2000). Bonding social capital facilitates people's ability to "get by," and bridging social capital permits people to "get ahead" (R. Putnam, 2000). Bonding capital exists in closed and homogeneous social networks and close-knit relations, such as with friends and family who can be relied on for fundamental survival in case of emergency (Mathie & Cunningham, 2003; R. Putnam, 2000). Bonding capital increases localized and exclusionary class-based trust, which may be bolstered by spatial separation (i.e., contemporary suburban development) and thereby could hinder community competency to adapt and innovate (Hanna, Dale, & Ling, 2009; R. Putnam, 2000). On the other hand, bridging capital occurs in socially heterogeneous networks, which enables members to access resources and opportunities (Hanna et al., 2009; R. Putnam, 2000). Bridging capital is also called "weak ties" or "business ties" since it can bring particular economic interests into networks through its leveraging role beyond the boundaries of a person's affinity group and/or the local community (Hanna et al., 2009; Mathie & Cunningham, 2003; R. Putnam, 2000). Specifically, bridging social capital connections in the community with the outer environments is a vital role for economic development and common prosperity (Mathie & Cunningham, 2003).

Therefore, mobilizing bonding capital and increasing bridging capital based on transactional norms and social trust are crucial for community development and solidarity (Mathie & Cunningham, 2003). Diversification of social networks promotes increased economic activities, which in turn creates opportunities for boosting and diversifying the inventory of social capital in terms of good-will (Mathie & Cunningham, 2003).

2.2.2.3. Benefits of Social Capital

Despite the complexity inherent in the concept of social capital, it is obvious that social capital works as a key element of the social relationships between individuals, groups, and communities (Elgar et al., 2011; Fukuyama, 1995; R. Putnam, 2000). Haynes (Haynes, 2009) depicted the main concepts and mechanisms of social capital as trust, community, reciprocity, interpersonal relationships, and networks. Adler and Kwon stated that the basic assumption of social capital is that it "is more than the sum of the various kinds of relationships" (Adler & Kwon, 2002, p. 36). When social capital is high, the levels of education, health, security, physical activity, political participation, economic/social equity, and social cohesion rise in society (Elgar et al., 2011; R. Putnam, 2000; World Bank, 2006).

Among a variety of research on social capital, Coleman's social capital is an important rationale associated with CC as a grassroots movement among small businesses. Coleman's concept of social capital is distinguished from physical or human capital in the form of social relations (J. Coleman, 1993; J. S. Coleman, 1988). He

argued that social capital exists in the relationship structures between actors to promote the efficient maximization of benefits to members of social networks. The significance, in defining social capital in terms of functional aspects, is that it contributes to economic benefits (Cattell, 2001; Glaeser et al., 2002; Westlund & Adam, 2010). Even though social capital is distinct from other forms of capital, social capital is regarded as involving physical and human capital rather than social relationships because the possessor of social capital eventually can benefit economically (Cattell, 2001; Glaeser & Redlick, 2009; R. Putnam, 2000; Westlund & Adam, 2010).

Regardless of its motives, social capital can enhance human capital of the possessor, and the economic functions of social capital can produce realistic and achievable economic capital (Glaeser & Redlick, 2009; R. Putnam, 2000; Westlund & Adam, 2010). Social capital is available to be accumulated and is a kind of intangible capital that increases the productivity of other production factors (R. Putnam, 2000). By reducing transaction costs, social capital makes it possible to input and operate human and physical capital efficiently (R. Putnam, 2000; Westlund & Adam, 2010). For example, the World Bank argued that intangible capital like trust and norms for economic development are more important than natural resources (World Bank, 2006). Social capital is a key resource to improve both the wealth and social stability of the country (World Bank, 2006). The greater the social capital (like trust that society has), the more increase there is in productivity and economic growth, thanks to the guaranteed safety of trade (Westlund & Adam, 2010; World Bank, 2006). Arrow (1972), a Nobel Prize winner in economics, said that all kinds of commerce need a certain level of trust.

As indicated above, social capital contributes to knowledge creation, product innovation, and entrepreneurship activation (R. Putnam, 2000; Westlund & Adam, 2010). In other words, trust and networks between economic actors contribute to the creation of new knowledge and product innovation through the promotion of exchanging and combining knowledge and resources (Nahapiet & Ghoshal, 1998). In a society with active networks, social harmony is enhanced since the network members can learn how to work with each other, and communication and information sharing can become activated between members (R. Putnam, 2000). Positive cooperation in virtuous social capital circles is likely to encourage and form future collaborations (Sander, 2002).

Furthermore, social capital can help community reconstruction and create fast recovery after crises, especially natural disasters. The Federal Emergency Management Agency (FEMA, 2011) and the Australian Red Cross (Australian Red Cross, 2012) recommended making partnerships among local communities, nongovernmental organizations, and national stakeholders. These partnerships are related to emergency management through empowering local action and civic activities and bolstering extant social infrastructure and community assets, which can increase social capital (Aldrich & Meyer, 2014).

In hazard situations, individual and community social networks can help people gain access to a variety of resources, such as information, supplies, financial resources, and emotional support (Aldrich & Meyer, 2014). Empirical evidence regarding disaster issues revealed that communities with high social capital are able to recover more quickly, and community members show more involvement in civic activities after a

disaster (e.g., the Gujarat and Kobe earthquakes in 1995, Hurricane Katrina in 2005, and Tōhoku, Japan earthquake and tsunami in 2011) (Aldrich & Meyer, 2014).

Various intervention methods to create or increase social capital can be employed such as CC, community gardens, mentoring programs, community events, social activity places, and the redesign of physical environments to boost social interactions (Aldrich & Meyer, 2014). For instance, after experiencing certain disasters, several communities, including Onagawa, Japan and Lyttleton, New Zealand, have introduced CC programs and have reported increased mental health and material benefits for community members after adopting the programs (Aldrich & Meyer, 2014).

In terms of demographic characteristics, previous empirical studies found that those who have lived longer in a neighborhood; are older, married and healthier (Leyden et al., 2011); have children (Nasar & Julian, 1995); are home owners, have higher incomes; and show higher educational attainment and higher levels of social capital, which positively impacts the odds of community engagement, social participation, community attachment, and local friendships (Fone, Farewell, & Dunstan, 2006; Larsen et al., 2004; Leyden et al., 2011; Nasar & Julian, 1995).

2.2.2.4. Social Capital and Community Currency

The CC system as a grassroots-social movement develops bridging social capital, which boosts generalized trust. In addition, voluntary groups (e.g., CC systems) are likely to be composed of like-minded people participating in a common motivation, which creates bonding social capital (Richey, 2007). For example, Ithaca HOURS (an

existing CC system) aims to promote their social capital in order to create relationships of trust and enhance these relationships outside of CC transactions (Wheatley et al., 2011). Also, it improves the members' quality of life and facilitates not only social capital but also financial, symbolic, cultural, and personal capital (Wheatley et al., 2011). Similarly, Calgary Dollars (a CC program) seeks to enhance economic stability, improve social inclusion, and develop bridging social capital, which reinforces the participants' capability to cope with social and economic crises or to allow them to upgrade their quality of life (Wheatley et al., 2011).

Social capital can be identified as goodwill among individuals and organizations in communities, namely "a kind, helpful, or friendly feeling or attitude" according to *Merriam-Webster Dictionary* (Kwon & Adler, 2014). It positively influences sharing information, boosting solidarity and increasing economic wealth among community members in terms of bonding and bridging social capital (Kwon & Adler, 2014). More importantly, social capital is essential in a crisis and crucial to support vulnerable people with increasing economic inequality. CC programs through social exchange in networks create social capital, which enable members to create new friendships, facilitate social interaction, diversify the concept of occupation, and improve quality of life (Soder, 2008).

In a CC system, the benefit of social capital exceeds economic advantages (Wheatley et al., 2011). CC facilitates social capital through promoting social interaction, providing information channels by interaction with other members, and intensifying a sense of community while increasing civic involvement (Soder, 2008). In

the present study, the social capital theory supports a focused framework for capturing the dynamic interplay between neighborhood environments, CC activities, community attachment, and quality of life.

2.3. BENEFITS OF COMMUNITY CURRENCY

Previous research on CC suggests that it plays an important role in the sustainable community development, increasing community members' quality of life (QOL) and community attachment. A CC system provides economic opportunities, combats poverty, improves local spending power, boosts local efficacy/empowerment, increases local commitment, encourages civic engagement, reduces social exclusion, fosters self-help, and promotes physical and mental health (Bellotti et al., 2014; C. H. Cooper, Fone, & Chiaradia, 2014; Della Peruta & Torre, 2015; Gomez & Helmsing, 2008; Lasker et al., 2011; Marks, 2012; North, 2014). Specifically, CC supports the social inclusion as a social incubator of mainly marginalized groups: the low waged, informal and/or temporary employees, the unemployed, the disabled, the elderly, the socially impaired and excluded, and at-risk youth (Gomez & Helmsing, 2008; Jacobsohn, 2014).

2.3.1. Community Attachment

CC programs as a civic activity also positively influence community attachment via social exchange and connections (Jacob et al., 2004; Slay, 2011). Through reciprocity of mutual aid in CC programs, mutual trust among residents can be boosted,

which will in turn strengthen community attachment (Jacob et al., 2004; Lasker et al., 2011; Nakazato & Hiramoto, 2012; Richey, 2007; Slay, 2011). The concept of community attachment is often synonymously used as other terminologies such as community satisfaction/sentiment/involvement, interest in community, sense of community, and social bonds (Cross, 2003).

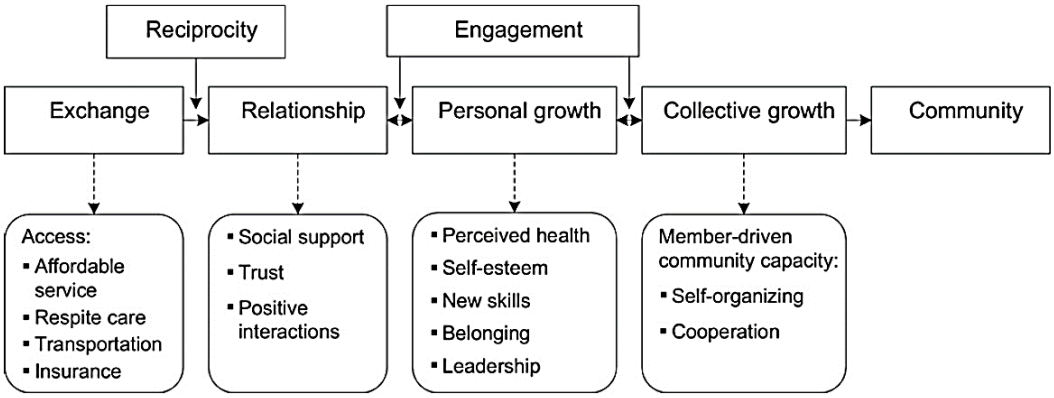
The notion of community attachment refers to inhabitant's sentimental attachments to a specific community (Brehm, Eisenhauer, & Krannich, 2004). Whereas a territorial element is one of the features of community, the concept of community attachment stresses social interactions between individuals and their community (G. T. Kyle, Theodori, Absher, & Jun, 2010). In this context, community is not strictly circumscribed by administrative districts (e.g., neighborhood, town, city, etc.) (Theodori, 2000). When residents are attached to their own community, they interact with others, care about community affairs/news, work on community issues, and participate in civic activities for community improvement (Rothenbuhler, Mullen, DeLaurell, & Ryu, 1996; Theodori, 2004). Specifically, community attachment is positively associated with social and mental well-being (such as residents' happiness and self-esteem) through social bonds and interactions (Cross, 2003; Rothenbuhler et al., 1996).

Residents' demographic factors have been predictors of community attachment; while no consensus exists on the direction of the relationship between those factors (e.g., gender, age, education, occupation, etc.) and community attachment. For example, education, income, length of residency, ownership of the dwelling, and presence of children were usually positively related to community attachment (C. Lee, Kang, Long,

& Reisinger, 2010; Vargas-Sánchez, Porras-Bueno, & de los Ángeles Plaza-Mejía, María, 2013). However, a study by Jun and Hur (2015) found that residents with lower educational attainment showed a higher community attachment.

2.3.2. Quality of Life

Previous CC studies have revealed the positive impacts of CC on quality of life (QOL) and subjective well-being through increased social interaction and social capital (Figure 2) (Collom, 2008; Jacob et al., 2004; Lasker et al., 2011). QOL is an important index for measuring the community members' satisfaction (Ballas, 2013). According to the World Health Organization (WHO), QOL can be defined as: "individuals' perception of their position in life in the context of culture and value system and in relation to their goals, expectations, standards and concerns." In general, the concept of QOL reflects multiple conditions of human life: well-being, happiness, life satisfaction, a sense of self-worth, empowerment, needs fulfillment, freedom, justice, efficiency, welfare, utility, poverty, development, livability, environmental quality, etc. (Massam, 2002; Matarrita-Cascante, Stedman, & Luloff, 2010; McGillivray & Clarke, 2006; McGillivray, 2007; Van Kamp, Leidelmeijer, Marsman, & De Hollander, 2003). Thus, QOL is a complex concept influenced by "the person's physical health, psychological state, level of independence, social relationships, and their relationships to salient features of their environment" (Marmot, 2003, p. 1).



Source: Letcher and Perlow, 2009, p. S297

Figure 2

Community-Building and Improved Well-Being

QOL has been measured in two ways: (1) objective indicators (employment and working conditions, finances, incomes, GDP per capita, average annual inflation rates, external public debts, number of amenities/disamenities, literacy, education, crime rates, divorce rates, life expectancy at birth, access to healthcare, infant mortality, pollution, etc.) (Matarrita-Cascante et al., 2010, p. 108); and (2) subjective indicators (self-ratings of intelligence, self-reported satisfaction, happiness, life enjoyment, perceived safety, emotional well-being, and meaningfulness of life, etc.) (Matarrita-Cascante et al., 2010, p. 108).

QOL or happiness has been found to be significantly and positively associated with individual's social and community relationships: good social relations such as family, work, community, and friends (Helliwell & Putnam, 2004; Holder & Coleman, 2009; Levasseur, Tribble, & Desrosiers, 2009), trust/satisfaction in neighborhoods and

government, and civic participation (R. Putnam, 2000). Specifically, opportunities for encouraging social activities such as volunteering are important for QOL of those who are older and disabled (Van Kamp et al., 2003).

Also, it has been positively related to personal characteristics: financial security (Bowling, 2011), good health, positive outlook, higher self-esteem, self-improvement (Bowling, 2011; Levasseur et al., 2009; Leyden et al., 2011; Leyden et al., 2011), marriage (Layard & Layard, 2011; Martikainen, 2009), old age, female gender, and residence in smaller towns (Berry & Okulicz-Kozaryn, 2011). Those who show higher levels of QOL/happiness have generally good mental health and live longer (Lyubomirsky, Sheldon, & Schkade, 2005). Education has mixed impacts on QOL; it has a positive and moderately strong influence on QOL in wealthy counties, but close to zero or negative impact in economically deprived areas (Mastekaasa & Moum, 1984).

Moreover, the unemployment status has serious and long-term negative effects on QOL/happiness (Clark & Oswald, 1994; Clark, 2003). Clark (2003) revealed that ‘‘unemployment hurts, but it hurts less when there are more unemployed people around’’, (p. 346). Local income inequality affects QOL/happiness significantly more than personal income levels (Ballas & Dorling, 2007), even though those with higher incomes indicated more positive thinking and higher degrees of QOL/well-being (Bowling, 2011).

2.3.3. Community Attachment and Quality of Life

Community attachment is also an important factor affecting residents' QOL and happiness (Helliwell & Putnam, 2004; Leyden et al., 2011; Leyden et al., 2011; L. Newman & Waldron, 2012; R. Putnam, 2000). In general, the degree of community attachment (a sense of community) and QOL would be higher for those who are married, have children (Nasar & Julian, 1995), have houses, are older, and live longer in the community; additionally, it is also higher for those who live in more racially homogenous and lower crime rate areas (Hur & Morrow-Jones, 2008; Hur & Nasar, 2014; Jun & Hur, 2015).

QOL in communities is interconnected with social policy and public goods for citizens. Public policies to enhance residents' QOL can make a city a more livable and sustainable place, which simultaneously reinforces residents' community attachment and satisfaction (Leyden et al., 2011; Leyden et al., 2011). Kent (1997) said that "the public good relates to minimum incomes, social security, health and education; and it is about the degree of equity in a society as well as its total wealth" (p. 157). Similarly, community/social sustainability[11] and the degree of equality of access are crucial for residents' QOL (S. H. Rogers et al., 2013). The sustainable society shows higher levels of social capital, which results in higher levels of quality of life, including "trust (social and interracial), diversity of friendships, political participation (conventional and

[11] According to Colantonio and Dixon (2011), social sustainability can be described by "10 dimensions and policy areas: demographic change (ageing, migration and mobility); education and skills; employment; health and safety; housing and environmental health; identity, a sense of place, and culture; participation, empowerment, and access; social capital; social mixing and cohesion; and well-being, happiness, and quality of life" (as cited in S. H. Rogers, Gardner, & Carlson, 2013).

protest), civic leadership and associational involvement, informal socializing, giving and volunteering, faith-based engagement, and equality of civic engagement across the community" (S. H. Rogers et al., 2013). Thus, how to deal with issues related to QOL may affect social justice and community cohesion.

2.4. FACTORS INFLUENCING COMMUNITY CURRENCY PARTICIPATION

2.4.1. Demographics

A study by Collom, Lasker, and Kyriacou (2012) showed that most CC members were female, lived alone, were highly educated, had lower income, and also had poorer health. Also, another study by Collom (2005) demonstrated that cities with CC systems featured particular demographic characteristics such as a greater number of populations that were younger, well-educated, single, non-white, transient, and non-homeowners.

2.4.2. Neighborhood Environments

2.4.2.1. Neighborhood Environments and Community Currency

People living in compact and mixed-use neighborhoods in which their homes are located within walking distance from their routine destinations will spend more time walking, and thereby through their everyday physical activities will have an increased chance to experience face-to-face encounters and have conversations with others (S. Rogers, Aytur, Gardner, & Carlson, 2012). Specifically, the areas with "greater density and connectivity" create and provide the chance for interplay with various physical destinations, and thereby allow and facilitate encounters with a variety of people, ideas,

social issues, and forces (B. B. Knudsen & Clark, 2013). This interaction can generate collective actions in response to community issues; a creation of trust among the individuals and organizations within the neighborhood; and a raised recognition of the fact that neighbors might need public goods. These ideas reflect the social capital theory associated with urban design (Baum & Palmer, 2002; Leyden, 2003; S. Rogers et al., 2012; Wood & Giles-Corti, 2008).

Walkable cities, defined as concentrated and connected with physical accessibility, provide social accessibility to numerous ideas, movements, and happenings (B. Knudsen, Florida, Stolarick, & Gates, 2008; B. B. Knudsen & Clark, 2013). Through walking, individuals can experience the social and physical variety of their city in a face-to-face and involved manner. The characteristics of face-to-face interactions, including motions and tone of voice, are more informative than computer-based interactions. Thus, they produce more emotional intimacy, which, in turn, increases trust, companionship, unity, and predictability (B. B. Knudsen & Clark, 2013; Routledge, 2003).

In addition, a study by Knudsen and Clark (2013) indicated that the "frequent casual (face-to-face) contact, whether intentional or spontaneous" is crucial for trust, solidarity, companionship, predictability, and the formation of Social Movement Organizations (SMOs), which focus on social, environmental, and/or human rights advancement work. These casual encounters bolster various social forms and the creation of SMOs through the acquiring, forming, and conveying of ideas, as well as the linking of diverse groups (B. B. Knudsen & Clark, 2013). This level of connectivity makes cities places of "social change and hubs" of innovation for economy, culture, and

policy (B. B. Knudsen & Clark, 2013). Likewise, encounters with various forces, issues, viewpoints, and ideas are essential to the generation of SMOs (B. B. Knudsen & Clark, 2013). The authors especially demonstrated strong direct effects of objectively measured walkability such as "density, connectivity, housing age diversity, and walking" on the occurrence of SMOs, using data from the ZIP Code Business Patterns and U.S. Census (B. B. Knudsen & Clark, 2013). Also, this study described the mediating effects of walking to work on the associations among density, connectivity, and the incidence of SMOs (B. B. Knudsen & Clark, 2013).

In sum, walking is a unique tool for encouraging social interaction. Walking is an effectual means of encountering the social and physical contexts of a neighborhood, where people can respond to concentration, connectivity, and mixed uses (B. B. Knudsen & Clark, 2013). By promoting face-to-face meetings with various social forces, walking increases socio-physical capital and thereby enables people to use varied types of information and different perspectives to accomplish civic goals such as SMOs (B. B. Knudsen & Clark, 2013). In this respect, the CC program as an "everyday community movement" (Collom, 2005) may actively be developed in a more walkable neighborhood environment.

2.4.2.2. Neighborhood Environments and Community Attachment

Social interaction in neighborhoods can be facilitated by pleasant walkable environments, which promote social networks to increase the probability for creating social capital through the casual face-to-face contacts (Jacobs, 1961; Leyden et al., 2011;

Leyden, 2003). A number of studies have demonstrated the impact of objective and perceived walkability on social connectivity (Amick & Kviz, 1975; Fleming, Baum, & Singer, 1985; Handy, Boarnet, Ewing, & Killingsworth, 2002; Kaczynski & Glover, 2012; Lund, 2002; Lund, 2003; Mason, 2010; Michelson, 1976; Talen, 1999; Yancy, 1971; Zhu et al., 2014). Existing empirical evidence has shown that the frequency of incidental meetings between community members is largely due to the frequency of walking[12] or strolling (Lund, 2003). The frequency of walking is fostered by positive perceptions of the physical environment (Foster, Hillsdon, & Thorogood, 2004; Handy et al., 2002; Lund, 2003). The most significant catalysts for walking are physical proximity and arrangements in terms of urban form, resulting in the spatial proximity of residents, which promotes social interactions (Amick & Kviz, 1975; Fleming et al., 1985; Michelson, 1976; Yancy, 1971).

Talen (1999) argued that some factors of architecture and site design[13] are related to community attachment (a sense of community) via increased social interaction: (1)

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[12] Walker (2009) indicated that "motivations for walking include exercise, pleasure, meeting people, relaxation, convenience, enjoying the environment and being outdoors. Common personal barriers include; journey length, time available, health and age, carrying shopping, perceptions of safety, as well as preferring to ride while environmental barriers include: poor lighting, poor air quality uneven and cluttered pavements, fear of crime, dirt, traffic, local amenity and safe crossing points" (as cited in Boyce, 2010, p. 466). Specifically, the levels of adults' physical activities have been affected by streetscape attributes such as neighborhood aesthetics, green space, safety, etc. (Badland et al., 2009). Also, children's physical activity engagement correlates with proximity to school, traffic safety, access to green spaces, and recreation places (Badland et al., 2009). Other factors including "health, time commitments, children, and weather" also are related to walking behavior (Rogers, Gardner, & Carlson, 2013).

[13] Kim (2007) also found the specific urban design factors reducing a sense of isolation and facilitating a sense of community: "slightly lower housing density (contradictory to the key design principles of new urbanism), wider streets, attached or larger garages, less hilly sites, smaller-sized blocks or districts, traditional-style shops and civic buildings, more convenient location of key community services or amenities such as the shopping center, the clubhouse or the children's center, more common greens, and greater integration of condominium and apartment buildings with single-family homes and townhomes." (p. 228)

density and scale (e.g., within small-scale and well-defined neighborhoods, increased residential density facilitates more face-to-face interaction); (2) streets (e.g., a place designed to promote safe, pleasant and active streets/sidewalks life strengthens community bonds and increase a sense of place by encouraging the opportunity for social encounter); (3) public space (e.g., parks and civic centers are typical public spaces standing for civic pride and a sense of place promoting the motion of community); and (4) mixed land uses (e.g., a mixed use area with residence and other facilities within walking distance of houses).

Other physical environmental attributes encouraging neighboring and community engagement are as follows: feelings of safety[14] (Jacobs, 1961; Lund, 2002; S. J. Newman & Duncan, 1979; R. Putnam, 2000); greater use of public space (Kim, 2007; Levine, 1999; Levine, 2002; Leyden, 2003); greater utilization of local facilities for shopping/groceries (Kim, 2007; C. Lee, Moudon, & Courbois, 2006; C. Lee & Moudon, 2006a; C. Lee & Moudon, 2006b; Moudon et al., 2006; Riger, LeBailly, & Gordon, 1981); more green spaces (Hur, Nasar, & Chun, 2010); the presence of semiprivate space (e.g., front porches, bars on windows, doors, etc.), continuous sidewalks, freedom from high-traffic streets (traffic-calming devices) (Wilkerson, Carlson, Yen, & Michael, 2012); absence of litter/graffiti (Wilkerson et al., 2012; Wood & Giles-Corti, 2008); more connected grid street networks, and mixed land use (Leyden, 2003).

[14] Active streets results in natural surveillance that people can watch the activities taking on the streets of the neighborhood as a daily routine activities (Jacobs, 1961). Putnam (2000) presented "higher levels of social capital, all else being equal, translate into lower levels of crime." (p. 309).

In addition, Oldenburg (1989) asserted that "third places" boost social congregation and interaction. Third places are defined as a "great variety of public places that host the regular, voluntary, informal, and happily anticipated gatherings of individuals beyond the realm of home and work" (e.g., cafes/pubs, restaurants, corner grocery shops, local libraries, public parks, community centers, hair salons, etc.) (Oldenburg, 1989, p. 16). These third places afford the opportunities for spontaneous contacts to meet and talk among diverse community members, which help to alleviate emotional and social loneliness (Rosenbaum, Ward, Walker, & Ostrom, 2007).

2.4.2.3. Objective and Perceived Neighborhood Environments

There is empirical evidence that the effects of perceived physical environments (subjectively measured physical environments) are different from and/or greater than objectively measured physical environments on neighborhood satisfaction, social capital, etc. (Jun & Hur, 2015; Kweon, Ellis, Lee, & Rogers, 2006; Wood & Giles-Corti, 2008). Wood et al. (2008) suggested that the significant factor for higher degrees of social capital was not the quantity of amenities but the "perceived adequacy of facilities and proximity to a shop." The authors' explanation for the correlation between quality of amenities and quantity of destinations suggests that there may exist an optimum quantity of destinations in the neighborhood to achieve maximum neighborhood social capital.

Also, a study by Jun and Hur (2015) indicated that the perceived walkability increased a sense of community, whereas objectively measured physical walkability does not. Moreover, perceived density was negatively related to a sense of community

while perceived accessibility to stores was positively related to it, which is contradictory to new urbanism's tenet. The authors explained the negative correlation between objectively measured physical walkability and neighborhood social relationship resulted from the intersection between high physical walkability and low socio-economic status.

Generally, the level of physical walkability increases when the location is closer to the inner city. However, the inner city neighborhoods with higher densities often have urban issues, such as heavy traffic and higher rates of crime and poverty (Jun & Hur, 2015). The issue of concentrated neighborhood poverty has generally been regarded as a hindrance to form social capital (Larsen et al., 2004). Moreover, inner cities with highly mixed land use attracts more visitors or strangers, which may cause inhabitants to have a lower sense of community and limited interactions with other neighbors (Wood et al., 2010). Those who live in the suburbs with better aesthetic features providing emotional pleasure may be more likely to walk and interact. Therefore, suburban residents may have a greater sense of community despite relatively lower physical walkability compared to the inner cities with higher physical walkability (Jun & Hur, 2015). These findings resonate with Appleyard (1976)'s observation: "The paradox is that as planners become more adept and sophisticated at conceptualizing so-called objective city—through the use of aerial photographs, maps, statistics, and mathematical modeling—their conceptual distance from the inhabitant's subjective personal city usually increases" (p. 1). Thus, urban planners need more efforts to understand public perceptions of the city for making better communities.

2.5. GAPS IN THE LITERATURE AND SIGNIFICANCE OF THIS STUDY

Geddes asserted that "a city is more than a place in space, it is a drama in time" (Patrick, 1915, p. 107). Also, Jacobs (1961) noted that urban form is a crucial factor to make cities safe, social, delightful and dynamic. Physical environments are comprised of smells, sounds, colors, textures, or other visual characteristics (supporting to find the paths anywhere to go in the neighborhood), which are the factors contributing to the formation of pleasant neighborhood environments (Kim, 2007). A study by Florida (2010) has also suggested that in his Place and Happiness survey, community satisfaction correlates with not only making friends but also pleasant physical environments such as aesthetics and amenities.

Today, increasing social capital may be a crucial issue for strengthening community sustainability in modern societies (Jun & Hur, 2015). Walkable neighborhoods can be a remedy for this negative situation. Existing evidence has indicated that objective and subjective walkability (such as the number and quality of accessible destinations) is significant for the creation and vitalization of social capital (Amick & Kviz, 1975; Fleming et al., 1985; Handy et al., 2002; Kaczynski & Glover, 2012; Leyden, 2003; Lund, 2002; Lund, 2003; Mason, 2010; Michelson, 1976; Richard, Gauvin, Gosselin, & Laforest, 2009; Talen, 1999; Yancy, 1971; Zhu et al., 2014). While walking, residents can learn about a neighborhood's material and nonmaterial resources including facilities. Also, safe parks, public spaces, and other soft edges (e.g., sidewalks), as well as grid street networks and mixed land use, can enhance social trust and community commitment. However, mixed results for the associations between the

physical and social neighborhood environments exist. The neighborhood social environment may not be completely enhanced by redesigning pedestrian infrastructure because there is a complex mechanism of the impacts of the neighborhood walkability on residents' social behaviors.

The present study is one of the first investigations into the relationship between the physical environment and CC activities, including their associations with community attachment and quality of life. The physical environment influences both human behavior and community viability (Jeffres, Bracken, Jian, & Casey, 2009; B. B. Knudsen & Clark, 2013; Lewicka, 2011; Leyden, 2003; Mehta & Bosson, 2010; Raymond et al., 2010; Wood et al., 2010). However, there has been little to no research into the association between neighborhood environments and CC activities. Therefore, concerning the relationships between neighborhood environments and CC activities, neither the mechanism through which they relate nor the specific dimensions to which they relate is known.

A city's physical environmental conditions (such as concentration and connectivity) all help to accelerate learning, enable creativity, spread ideas, and connect with and encourage diversity (B. B. Knudsen & Clark, 2013). Specifically, walking facilitates casual face-to-face contact among neighbors, through which individuals increase their physical and social interaction with other community members, strengthening social capital among community members (B. B. Knudsen & Clark, 2013; Lewicka, 2011). These characteristics affect the activities of grassroots social

movements like CC. Thus, this study tested the hypothesis that highly walkable neighborhood environments will increase participation in CC activities.

In terms of measuring physical environments, while assessment methods have progressed significantly in recent years, many challenging issues still remain in environment-social activity studies. For instance, many barriers still exist in measuring physical environments, such as: (1) the lack of data, (2) the lack of standardization, (3) the difficulty of access, (4) the low quality or incompleteness of available data, and (5) computational and technical skills often needed for data processing (Brownson, Hoehner, Day, Forsyth, & Sallis, 2009; C. Lee et al., 2006; Moudon et al., 2006). This study addressed these issues by using a recently developed measurement tool available for all U.S. locations, Walk Score, to objectively measure neighborhood walkability.

The previous research only used an objectively measured walkability index to examine the relationship between incidence of SMOs and physical environments (B. B. Knudsen & Clark, 2013). However, Geddes's well-known dictum of "survey before plan" suggests that one should study community members' perceptions before starting urban planning. Thus, this study also used a survey to subjectively examine neighborhood walkability to more completely and accurately capture the perceived walkability of neighborhood environments. Furthermore, the present study employed the data of both CC users and nonusers. It is the first attempt to include CC nonusers in a CC study, with comparison made to CC users; existing studies have been limited to only studying CC users.

Another contribution of this study is related to the study's conceptual framework. This study first measured place attachment (place dependence) as a subjective environmental factor, and then assessed community attachment. Most of the neighborhood perception-related studies use only a scale of either place attachment or community attachment. Unlike place attachment, community attachment focuses more on resident interaction (Talen, 1999). Thus, this study separated the measurement of community attachment from that of place attachment, and examined place attachment through a place dependence measurement scale, not including place identity.[15]

Furthermore, the multidimensional community attachment construct has rarely been measured in community studies. This study assessed community attachment, including perceptions of community (i.e., *neighborhood cohesion*) and the actual behavior of community members (i.e., *community support* and *local retail loyalty*).

The findings of this study will provide greater understanding of mechanisms through which community engagement and physical environments might correlate. Thus, this study will contribute to evidence-based knowledge for improving community design to promote civic activities, resulting in community regeneration through increased social capital.

[15] Items on the place identity scale usually used for the place attachment measurement factor (Williams & Vaske, 2003) are very similar to those of community attachment in terms of neighborhood belonging.

3. RESEARCH QUESTIONS AND HYPOTHESES

3.1. RESEARCH QUESTIONS

The present study was guided by the following questions based on the existing knowledge: (1) what is the role of walkable neighborhood environments in improving residents' participation in CC activities and community attachment? (2) what is the association between members' CC activities, residents' community attachment, and between CC activities and quality of life? (3) what are the relationships among the socioeconomic status and demographic characteristics of the residents, CC membership, community attachment, and quality of life?

To answer these questions, a set of research aims were identified as high-priority issues. As primary aims, this dissertation (1) assesses the relationship between neighborhood environments – *destination accessibility, accessibility to services, comforts in walking, crime safety, place dependence,* and *social activity places*[16] – and CC activities; (2) identifies the association between CC members' activities and community attachment; and (3) tests the correlation between CC members' activities and quality of life. As secondary aims, this dissertation (1) examines the association between neighborhood environments and community attachment; and (2) assesses the relationship between community attachment and quality of life.

[16] Italic terms signify the variable names.

This research utilizes quantitative research methods to investigate the proposed hypotheses and conceptual models. The subjectively measured data[17] were collected through a self-administered survey, and the objectively measured data[18] were collected from WalkScore.com and the U.S. census.

3.2. CONCEPTUAL FRAMEWORK

The conceptual framework for this research is shown in Figure 3. The fundamental framework of this study is based on the fact that people's social participation, social activity levels, and community attachment can be connected with their neighborhood environment conditions. Based on social exchange, social capital theory, and the literature review, this study proposed a conceptual framework for active social participations and quality of life among community members. It specified three potential factors including objective environmental attributes, perceptions and assessments of objective environmental attributes, and community attachment.

[17] (1) neighborhood environments: accessibility to services, comforts in walking, crime safety, place dependence, and social activity places; (2) CC activities and satisfaction; (3) community attachment; (4) quality of life; and (5) individuals' demographics.

[18] (1) neighborhood environments: destination accessibility from Walk Score; (2) neighborhood level confounding factors: city population, population density by city, and poverty rate by city from U.S. Census (2014).

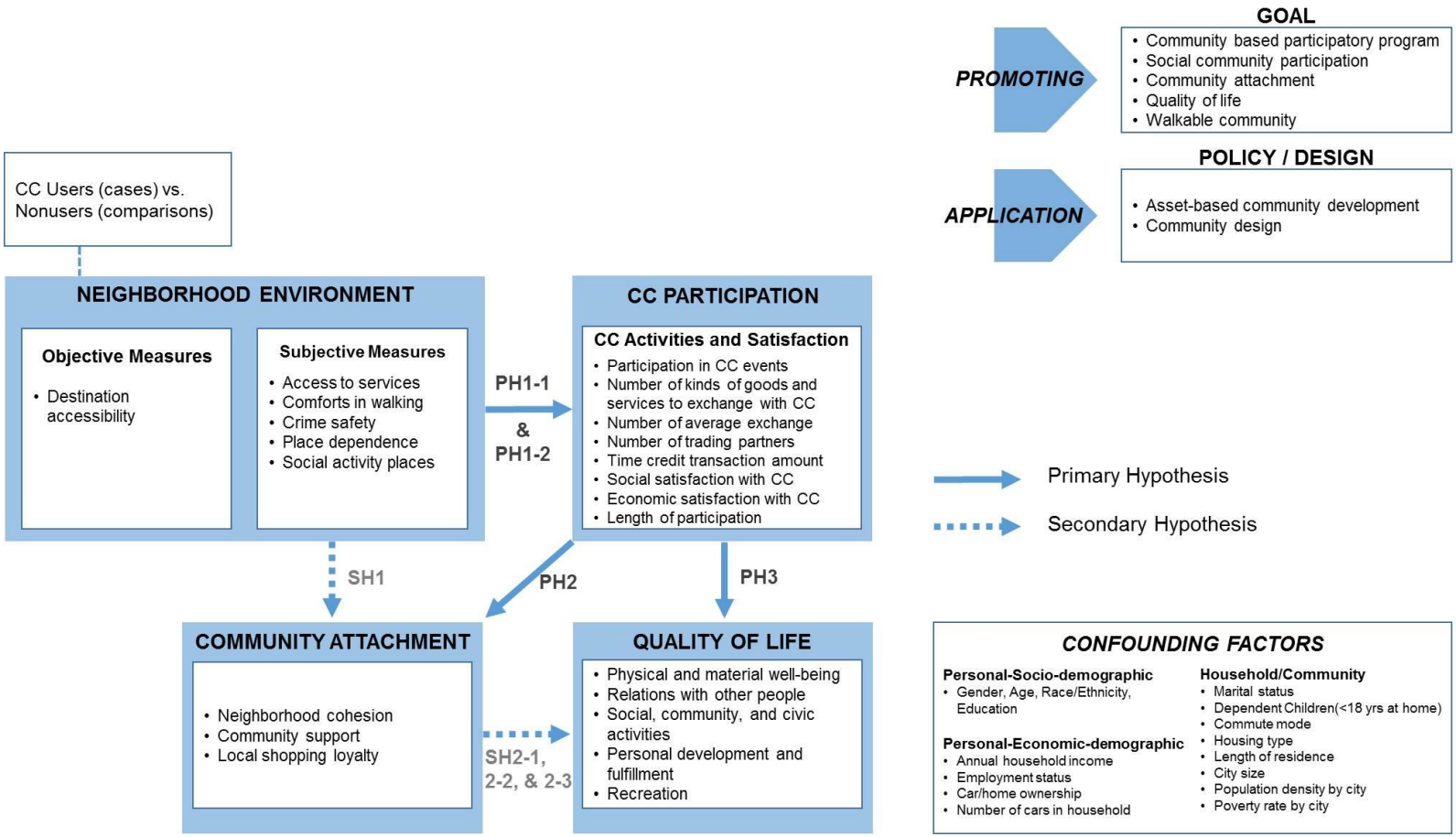


Figure 3

Conceptual Framework

3.3. RESEARCH HYPOTHESES

Given the research aims, four primary hypotheses and four secondary hypotheses in this research have been developed:

Primary Hypothesis

- **Primary Hypothesis 1-1 (PH1-1)**: Those living in higher-walkability neighborhoods[19] will participate in CC activities than those living in lower-walkability neighborhoods.

  Primary Hypothesis 1-2 (PH1-2): Among CC users, those living in higher-walkability neighborhoods will participate in CC activities than those living in lower-walkability neighborhood environments.
- **Primary Hypothesis 2 (PH2)**: Among CC users, more frequent CC activities will increase their level of community attachment.
- **Primary Hypothesis 3 (PH3)**: Among CC users, more frequent CC activities will enhance their quality of life.

Secondary Hypotheses

- **Secondary Hypothesis 1 (SH1)**: Among both CC users and nonusers, those living in higher-walkability neighborhoods will show higher levels of community attachment than those living in lower-walkability neighborhoods.

[19] i.e., higher destination accessibility, higher perceived neighborhood walkability, higher usage of places for social activities, and higher place attachment

- **Secondary Hypothesis 2-1 (SH2-1)** : Among both CC users and nonusers, those with a greater level of community attachment will also enjoy a higher quality of life than those with lower levels of community attachment.

  Secondary Hypothesis 2-2 (SH2-2): CC users will enjoy a higher quality of life than nonusers living in neighborhoods with physical environments similar to those of CC users.

  Secondary Hypothesis 2-3 (SH2-2): Higher socioeconomic status will increase the quality of life for both CC users and nonusers living in physical neighborhood environments similar to those of CC users.

4. RESEARCH DESIGN AND METHOD

This section outlines the research methods and data used in this research, including research design with variables, research setting, sampling, and measurement methods. This chapter also specifies methods for understanding the associations between neighborhood environments, CC activities and satisfaction, community attachment and quality of life.

4.1. RESEARCH DESIGN

This study is cross-sectional and includes CC users and nonusers. CC nonusers live in the same cities as CC users.

4.2. STUDY LOCATION

The present study was conducted in a community that had implemented a Time Banking system, the Crooked River Alliance of TimeBanks (CRAT) located in the Great Lakes region of Ohio which uses the person-hour as the unit of exchange (Figure 4). CRAT consists of five TimeBanks: Kent Community TimeBank, Twinsburg Community TimeBank, Ravenna Community TimeBank, Stark County Community TimeBank, and Cuyahoga Falls Community TimeBank.[20] It is the second largest TimeBank and one of the most active of the 264 TimeBanks in TimeBanks USA (TimeBanks USA, 2016).

[20] The Kent Community TimeBank opened in April 2010, following with the Twinsburg Community and the Ravenna Community TimeBanks in 2013, the Stark County Community TimeBank in 2014, and the Cuyahoga Falls Community TimeBank in 2015.

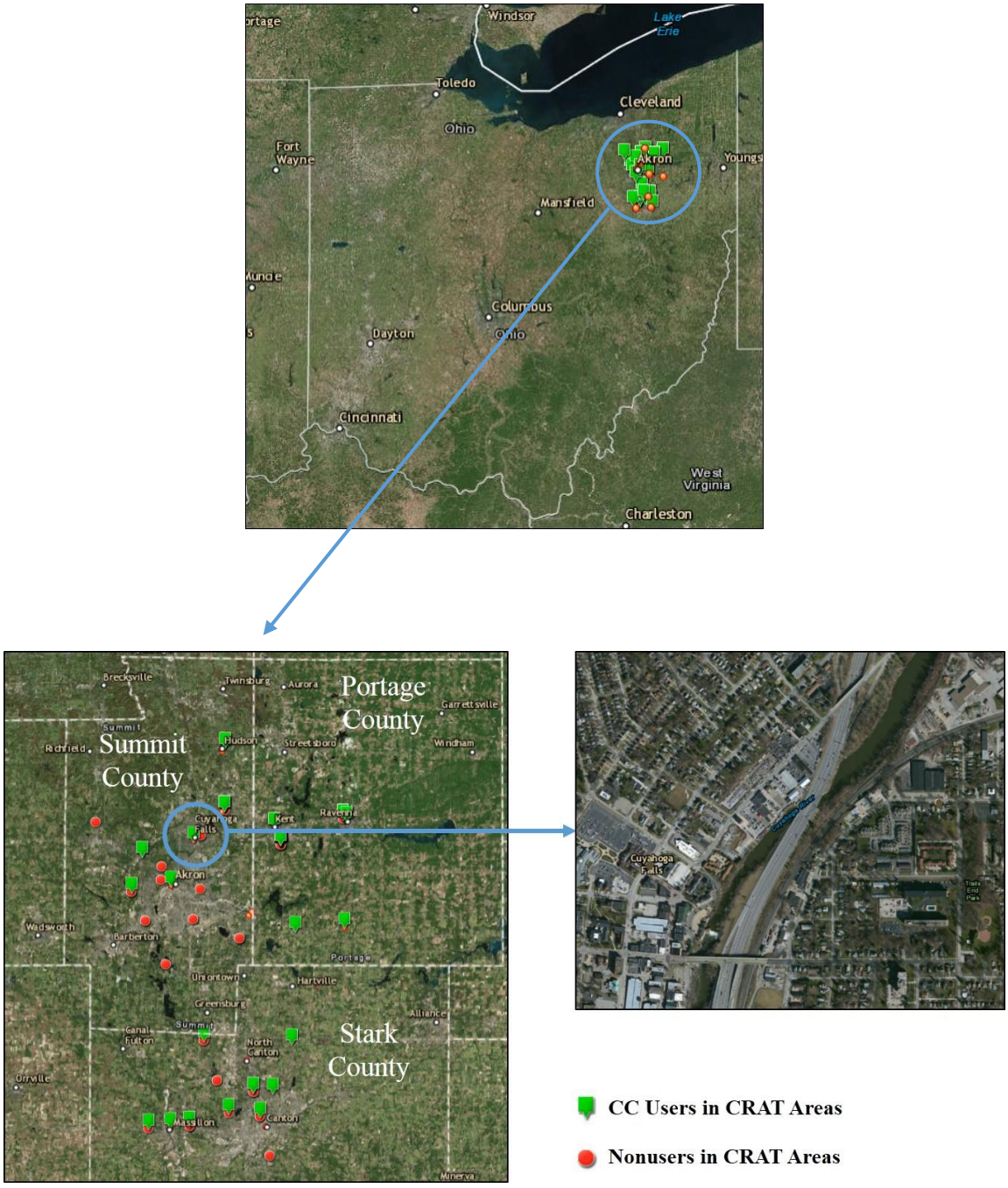


Figure 4

Geographic Location[21] of Crooked River Alliance of TimeBanks

[21] Maps were created through ArcGIS.

The members of the TimeBank can trade goods and services with Time Dollar, and then the exchanges are recorded at the TimeBank online system as credits or debits, which makes it easy to track the members' activities. Meanwhile, other CC systems, such as Ithaca Hours or LETS, use their own paper money or their own local online money, which has a value corresponding with that of national fiat money (i.e., national currency). The rationale in choosing the TimeBank system as the study setting was that CC activities (e.g., number of exchanges) could be tracked more easily than those in other systems, and the database system of TimeBank is more organized than those of other CC systems (i.e., directory of the system). The TimeBank system updates daily and shows real-time exchanges (TimeBanks USA, 2016).

4.3. STUDY PARTICIPANTS AND SUBJECT RECRUITMENT PROCESS

Participants were comprised of both CC users and nonusers living where CRAT is located. Nonusers are those who do not use CC but live in the same cities as CC users.

4.3.1. Users

I sent CRAT built an email message with the URL for the online survey, and the CRAT staff forwarded that email to their members, including several follow-up reminders to increase the response rate, from March 2015 through June 2015 when the temperature would be most favorable for walking. The overall response rate was about 12 percent, which generated a sample of 77 from a total of 620 members.

4.3.2. Nonusers

After the data collection of CC users, nonusers of CC in OH were recruited via Mechanical Turk (MTurk) from July through September in 2015. MTurk is an online survey service introduced by Amazon in 2005, where the participants (called workers in MTurk) can browse and complete the survey (called HITs: Human Intelligence Tasks in MTurk) for nominal fees. The survey was restricted to OH participants with at least 95% approval rating for response accuracy. The final sample who lived in CRAT areas (10 cities where CC members lived) consisted of 42 (6.37%) respondents from a total of 659 responses in OH.[22]

A growing body of behavioral research topics have been investigated employing MTurk, such as clinical research, political research, personality, game theory research, behavioral economics, theoretical biology, and consumer behavior research, from more than 16 of the top 30 universities in the U.S. (Goodman, Cryder, & Cheema, 2013; Litman, Robinson, & Rosenzweig, 2014).

In 2014, the MTurk workforce consisted of more than 500,000 individuals from 190 countries (Paolacci & Chandler, 2014). The demographic characteristics of MTurk participants present more ethnically and socio-economically diverse than those of other typical online samples and are more representative of the general population than those of traditional samples (Buhrmester, Kwang, & Gosling, 2011; Casler, Bickel, & Hackett, 2013; Goodman et al., 2013; Minton, Gurel-Atay, Kahle, & Ring, 2013). Participants tend to be female, slightly younger (around 30 years old), are more likely to be liberal,

[22] The population of CRAT areas was about 3.7% of the whole OH population in 2013.

educated, Asian (Berinsky, Huber, & Lenz, 2012), less religious, unemployed, generally have a slightly lower income (Paolacci, Chandler, & Ipeirotis, 2010), and are less likely to be Black or Hispanic (Berinsky et al., 2012) in the U.S.

MTurk reports similar results to other online and traditional methods of recruitment (Buhrmester et al., 2011; Casler et al., 2013), and the responses from MTurk showed acceptable psychometric features (Buhrmester et al., 2011; Casler et al., 2013; Goodman et al., 2013; Minton et al., 2013). With reliable results and high external validity, the MTurk sample generally provides fast, inexpensive, heterogeneous, and efficient data collection in behavioral research and the most representative samples of the population in the U.S. (Buhrmester et al., 2011; Casler et al., 2013; Goodman et al., 2013; Holden, Dennie, & Hicks, 2013; Minton et al., 2013).

4.4. STUDY CONSTRUCTS AND VARIABLES

The selection of study variables were conceptualized employing three factors of personal, social, and physical environments measured by objective and subjective methods. Personal factors included participants' demographic and socioeconomic characteristics and quality of life. Social factors comprised community attachment such as *neighborhood cohesion, community support*, and *local shopping loyalty*. Finally, physical environmental factors were captured as participants' objectively measured walkability (i.e., Walk Score) and perceptions about walkability (i.e., *perceived accessibility to services* and *comforts in walking*), *safety from crime, place dependence*, and *social activity places* in participants' neighborhoods. The overall research constructs and variables were presented in Table 2.

Table 2

Research Constructs and Variables

Construct		Variables		Measurement	Source
Quality of Life	Dep. *	Physical and material well-being (composite) Relations with other people (composite) Social/community/civic activities (composite) Personal development and fulfillment (composite) Recreation (composite)		7-point Likert scales	Survey (Flanagan, 1982)
Neighborhood Environment					
Objective	Ind.	Destination Accessibility	Walk Score: accessibility to errands, culture, groceries, parks, dining and drinking, school, and shopping	Continuous	WalkScore.com
Subjective (Perception)	Ind.	Perceived Neighborhood Walkability	- Access to services (composite) - Comforts in walking (composite)	5-point Likert scales	Survey : NEWS (Cerin, Saelens, Sallis, & Frank, 2006; Olvera et al., 2012), UHPEAK (Olvera et al., 2012)
	Ind.	Crime Safety		5-point Likert scales	Survey : NEWS (Cerin et al., 2006)
	Ind.	Place Dependence		5-point Likert scales	Survey (D. R. Williams & Vaske, 2003)
	Ind.	Social Activity Places	- Number of social places - Frequency of social places - Proximity - Transport mode	Ordinal Categorical	Survey (J. H. Lee, 2015)
Community Currency Activities/ Satisfaction	Dep. / Ind.	Participation in CC events Number of kinds of goods and services Average number of exchanges Number of goods/services exchanged Number of trading partners Actual transaction amount of CC Social satisfaction with CC (composite) Economic satisfaction with CC (composite) Length of Participation		Ordinal Continuous	Survey (Wheatley, 2006)
Community Attachment	Dep. / Ind.	Neighborhood Cohesion (composite) Community Support (composite) Local Retail Loyalty (composite)		4-point Likert scales	Survey (Peterson, Speer, & McMillan, 2008) Survey (C. Lee, Kang, Long, & Reisinger, 2010) Survey (Hozier & Stem, 1985)
Demographic and Socioeconomic Characteristics	Ind.	Personal-Socio-demographic	- Gender, Age, Race/Ethnicity - Education	Categorical, Continuous, Ordinal	Survey, US Census
	Ind.	Personal-Economic	- Annual household income - Employment status - Car/home ownership - Number of cars in household	Continuous, Categorical	Survey, US Census
	Ind.	Household/ Community	- Marital status - Dependent children(<18 yrs at home) - Commute mode - Housing type - Length of residence - Reasons why to live in the community - City size - Population density by city - Poverty rates by city	Categorical, Continuous, Ordinal	Survey, US Census

*'Ind.' is independent variable; 'Dep.' is dependent variable

4.4.1. Subjective Measures

Survey questionnaires (Appendix N) were cultivated based on the literature review and previously validated instruments[23] (Table 2). Subjectively physical environmental variables included perceived neighborhood walkability, usage of social activity places, and place dependence. This study also considered demographic and socioeconomic characteristics, CC activities, and community attachment as potential correlates of quality of life. Those theoretically and statistically significant demographic and socioeconomic characteristics of participants[24] were considered as confounding factors based on the existing literature, which later were utilized to estimate the base model in the multivariate analyses. Most items in the instrument of the present study were measured along a 4[25], 5[26], or 7[27]-point Likert scale by asking to what extent the respondents reacted to each description or agreed with each statement. Total scale scores of those items for each variable were calculated by the mean of adequately associated items, and considered as continuous variables during the analyses. A higher score indicates higher degrees of agreement for each question.

To evaluate quality of life (QOL), this dissertation used the Quality of Life of Individuals scale that consists of five dimensions such as material comforts, relations

[23] Specifically, the questionnaires of CC activity were based on several CC staffers' feedback and suggestions.

[24] They included age, race, gender, education level, marital status, work status, occupation, commute mode, number of children under 18 years old, household income, house ownership and housing type, car ownership and number of cars, years lived in the current community, reasons for choosing the current community, city size, population density, and poverty rates.

[25] Community attachment factors: *neighborhood cohesion*, *community support*, and *local shopping loyalty*

[26] Perceived neighborhood walkability (*accessibility to services* and *comforts in walking*), *crime safety*, and *place dependence*

[27] Quality of life factors: *physical and material well-being*, *relations with other people*, *social/community/civic activities*, *personal development and fulfillment*, and *recreation*

with others, social activities, personal development, and recreation (Flanagan, 1982). All questions used a 7-point Likert scale (from 1= *terrible* to 7= *delight*).

For measuring participants' perception of neighborhood environments, perceived neighborhood walkability (*access to services* and *comforts in walking*), *crime safety, place dependence,* and *social activity places* were measured. To measure perceived neighborhood walkability (*access to services* and *comforts in walking*), a subscale of Neighborhood Environment Walkability Scale (NEWS) (Cerin et al., 2006) and Urban Hispanic Perceptions of Environment and Activity Among Kids (UHPEAK) scale (Olvera et al., 2012) were used.[28] *Crime safety* was measured by a subscale of NEWS[29] and *place dependence*[30] was measured by a subscale of Place Attachment scale (D. R. Williams & Vaske, 2003). Those questions regarding perceived neighborhood walkability (*access to services* and *comforts in walking*), *crime safety,* and *place dependence* used a 5-point Likert scale (from 1= *strongly disagree* to 5=*strongly agree*). To measure s*ocial activity places* (J. H. Lee, 2015), respondents were asked questions such as frequency and the number of social activity places (treated as a continuous variable), mode of transport (such as *by walking*), and the estimated time of arrival (measured along a scale from 1= *less than five min*. to 5= *over 20 min*.).

To measure Community Currency activities, respondents were asked questions such as *length of participation*, *participation in CC events*, the *average number of exchanges*, the *account balance*, *social/economic satisfaction with CC* (Wheatley, 2006),

[28] *Access to services* (three items) was measured by NEWS, and *comforts in walking* (six items) was measured by UHPEAK.
[29] Three items, reverse-scored
[30] Six items

the *number of kinds of goods and services*[31], the *number of goods/services exchanged*[32], the *number of trading partners*[33], actual *CC transaction amounts of goods/services available or unavailable on the market*[34]. Questions regarding social/economic satisfaction with CC used a 5-point Likert scale (from 1= *strongly disagree* to 5= *strongly agree*).

The community attachment scale was classified into three main factors, such as *neighborhood cohesion*[35] (Peterson, Speer, & McMillan, 2008), *community support* [36] (C. Lee et al., 2010), and *local shopping loyalty*[37] (Hozier & Stem, 1985). Higher scores show better community attachment. Those questions regarding community attachment employed a 4-point Likert scale (from 1= *not at all* to 4= *completely*).

Also, questions of demographic and socioeconomic characteristics included personal socio-demographics (e.g., gender, age, etc.), personal economic-demographics (e.g., annual household income, employment status, etc.), and household/community aspects (e.g., marital status, commuting mode, poverty rates by city, etc.) based on the U.S. Census.

The current study protocols and instruments were approved by the Institutional Review Board at Texas A&M University. The online survey was hosted by Qualtrics.com, a web-based survey program. Participants clicked the URL for

[31] Newly developed
[32] Newly developed
[33] Newly developed
[34] Newly developed
[35] Eight items
[36] Three items
[37] 10 items

the online survey, and then they were brought to a research information page and online consent form. After consenting, each survey section was presented in the following order: neighborhood walkability, social activity places, place dependence, CC participation, community attachment, quality of life, and demographics.

4.4.2. Objective Measures

To analyze the objective physical environmental factor hypothetically associated with CC activities and community attachment, Walk Score was employed, which consists of street connectivity (e.g., block size, the number of intersections, and connection to mass transportation hubs) and amenity concentration (e.g., the density of neighborhood amenities) (Walk Score, 2016). Walk Score, a web-based tool, calculates the walkability of individual addresses based on the distance to adjacent amenities within 1.5 miles (a 30-minute walk) by analyzing hundreds of walking routes to those amenities (Walk Score, 2016). In this tool, each address is scored out of 100 by the Walk Score algorithm. Scores are calculated based on the proximity of the individual address to nearby amenities such as retail, culture, errands, groceries, parks, restaurants, schools, and transit stops. Amenities within a quarter-mile (a 5-minute walk) of the individual address are awarded the maximum score available, while amenities at the furthest distances (a 30-minute walk) receive the minimum number of points. After a 30-minute walk to amenities, there are no points given (Walk Score, 2016).

Previous research indicates the generalizability of Walk Score when using multiple geographic scales and locations (Duncan, Aldstadt, Whalen, Melly, &

Gortmaker, 2011). Today, Walk Score includes more pedestrian-friendly features by examining population density and road metrics (i.e., intersection density and block length).[38] The current Walk Score also has enhanced validity because it uses network distances rather than "as-the-crow-flies" distances from the point of the address to the adjacent amenities; the amenities are also weighted (Duncan et al., 2011). Previous study found that significantly positive associations were shown between Walk Score and objective (such as street connectivity, measured by GIS) and subjective measures (such as perceived walkability, measured by survey) of the physical neighborhood environment (Carr, L J Carr, S I Dunsiger,B H Marcus, 2011). Additionally, Walk Score was more related to utilitarian walking (such as walking for transport), while perceived walking was more associated with leisure walking (such as walking for health or recreation) (Chiu et al., 2015; Tuckel & Milczarski, 2015). This dissertation utilized Walk Score for measuring the destination accessibility of the physical neighborhood environments.

4.5. DATA ANALYSIS

All candidate variables[39] in Table 2 were investigated for the item reliability, confirmatory factor analyses (CFA) (test results in Appendix A, B, C, and D), and their bivariate relationship with the outcome variable to conduct data reduction. Reliability

[38] Walk Score methodology, data are obtained from "Google, Education.com, Open Street Map, the U.S. Census, Localeze, and places added by the Walk Score user community" (Walk Score, 2016).

[39] A factor analysis and Cronbach alpha test were conducted for composite scores such as *access to services, comforts in walking, crime safety, place dependence, community currency social satisfaction/economic satisfaction, community attachment factors*, and *quality of life factors*.

coefficients (Cronbach's alpha) were reviewed to verify internal consistency of the measurement scales used. A high correlation among items will produce a high alpha score with a high degree of reliability. At the same time, confirmatory factor analyses (CFA) were carried out to examine the construct validity to decide whether each set of items sufficiently measured the theoretical latent factors. The goodness of fit of the measurement model was tested by the Root Mean Square Error of Approximation (RMSEA) (Steiger & Lind, 1980), the Comparative Fit Index (CFI) (Bentler, 1990), and the Tucker-Lewis index (TLI) (Tucker & Lewis, 1973). A RMSEA value with 0.08 or less indicates acceptable fit. CFI and TLI values with 0.90 or more indicate an acceptable fit. Considering the results from these measurements, items with low reliability and validity values were excluded from the survey data, depending on the interlocking theories of the present study.

The composite scores were calculated for perceived neighborhood environments[40] captured in a 5-point Likert scale, CC social /economic satisfaction measured in a 5-point Likert scale, community attachment factors[41] measured in a 4-point Likert scale, and quality of life factors[42] assessed in a 7-point Likert scale, by averaging the value of significantly associated variables within the same group.[43] Higher scores always means higher levels of these variables.

[40] Two perceived walkability items (*access to services* and *comforts in walking*), *crime safety*, and *place Dependence*
[41] *Neighborhood cohesion, community support*, and *local shopping loyalty*
[42] *physical and material well-being, relations with other people, social/community/civic activities, personal development and fulfillment*, and *recreation*
[43] The distributions of these variables showed continuous characteristics.

To compare data between CC users and nonusers, bivariate tests for two independent samples, a t-test or chi-square test, were conducted. Those variables significant at the 0.1 were considered for the multivariate analyses except for the several theoretically significant socio-demographic variables.

Study variables had a few missing values ranging from 2 to 8%. The sample size of this dissertation is small, thus, missing imputation was needed to increase the statistical power. Mean/median or random imputation methods were applied to those missing. All imputations were performed for CC users and nonusers, separately (Table 3). Test results (Appendix E) showed that imputations did not introduce bias, compared to the non-imputation model.

Table 3

Missing Imputation

Measured variable	*N* (Full = 119)	Missing imputation
Social Activity Places		
Number of social activity places	1	Missing in the CC users, replaced with the median of that of CC users.
Frequency of social activity places	1	Missing in the CC users, replaced with the median of that of CC users.
Community Currency Activities		
Participation in CC events	1	Missing in the CC users, replaced with the median
Length of CC membership	1	Missing in the CC users, replaced with the mean
Time credits to use for obtaining services	2	Missing in the CC users, replaced with the median
Time credits to use for obtaining services available on the market	2	Missing in the CC users, replaced with the median
Time credits to use for obtaining services not available on the market	4	Missing in the CC users, replaced with the median
TC to receive for providing services	4	Missing in the CC users, replaced with the median
TC to receive for providing services available on the market	3	Missing in the CC users, replaced with the median
TC to receive for providing services not available on the market	4	Missing in the CC users, replaced with the median
Quality of Life		
Social, Community, and Civic activities	1	Missing in the CC users, replaced with the mean of CC users' social activities.
Demographics		
Sex	2	Missing in the CC users, randomly assigned using probability, one is replaced with female, and the other with male.
Age	2	One is CC user, and the other is nonuser. Replaced with the mean age of each group, users and nonusers, respectively.
Race	1	Missing in the CC users, replaced with the median race of CC users: white
Children in household	1	Replaced with "having children in household", based on the answer of the question: the quality of life with "having and rearing children"
Household income	3	Missing in the CC users, replaced with the median income of CC users.
Housing type	1	Missing in the CC users, replaced with "single family housing", based on the median "housing type" when the respondent was a house owner.
Commute mode	9	Replaced with "others", because the respondents were neither employed outside home nor students.
Number of cars in household	6	Missing in the CC users, if the missing was a car owner, it was replaced with 2, based on the median number of cars among car owners. If the missing was not a car owner, it was replaced with 1, based on the median number of cars among non-car owners.
Length of residency	1	Missing in the CC users, replaced with the mean.

Note

(1) An objectively measured variable, "*destination accessibility*", was not imputed for the statistically better model fits. Only subjectively measured variables were imputed.

(2) For continuous variables, the missing value was replaced with the mean. However, if the standard deviations of those variables are greater than the mean values, the missing value was replaced with the median. For categorical variables, the missing value was replaced with the median.

For multivariate analyses, the logistic regression or regression with robust standard errors model was carried out based on the outcome variable.[44] The modeling employed a three-step process: (1) base model assessment, (2) one-by-one test, and (3) final model assessment. The base model assessment involved only the confounding variables (demographics and socioeconomic characteristics). One-by-one tests were performed by applying one independent variable at a time to the base model to check each independent variable's own significance as a predictor. The final model was assessed with all significant variables from the one-by-one test. A *p*-value of less than 0.1 was used for the statistical significance. However, several extra variables with marginal significance ($0.1 \leq p \leq 0.2$) were retained in the model but only if these variables were theoretically important (e.g., length of residency based on social capital theory) or improved in the overall model fit (e.g., R^2).

Homoscedasticity, residuals' normality, and multicollinearity were verified by the Breusch-Pagan test, skewness and kurtosis test for normality, and VIF test for ordinary linear regression, respectively. Under the five Gauss-Markov assumptions[45], the ordinary least squares (OLS) estimators are the best linear unbiased estimators (BLUEs) (Wooldridge, 2012). If the OLS regression shows heteroscedasticity, the usual standard error and test statistics are not valid anymore even though heteroscedasticity does not generate bias or inconsistency in the OLS estimators (Wooldridge, 2012). The robust

[44] For the model with the binary outcome variable, the logistic regression was conducted. Also, regressions with robust standard errors were carried out if the multivariate regression model showed heteroscedasticity or residuals' non-normality.

[45] Assumptions of MLR (Wooldridge, 2012): (1) linear parameters; (2) random sampling; (3) no perfect collinearity; (4) zero conditional mean; and (5) homoscedasticity.

standard errors[46] can effectively deal with minor concerns about heteroscedasticity, normality of errors, or some observations in the presence of large residuals, leverage or influence (Desa, 2012). Thus, when the OLS assumptions of homoscedasticity or normal distribution of errors were violated, the regression with robust standard errors was used in this study. With the robust standard errors, the coefficients are the same as in an ordinary OLS, however, the standard errors take into account concerns about heteroscedasticity and lack of normality, presenting the changes in the standard errors and t-tests from those of ordinary OLS (Wooldridge, 2012).

Among the models using logistic regressions, chi-square tests were employed to compare the -2 log likelihood ratios to determine the best-fitting model. F-tests were used to compare the alterative models using regressions with robust standard errors in order to determine the best-fitting model. All statistical analyses were conducted with the statistical package STATA 14.0.

[46] STATA provides robust standard errors measured using a Huber-White sandwich estimator. The robust standard errors can be used even when the OLS assumptions are met.

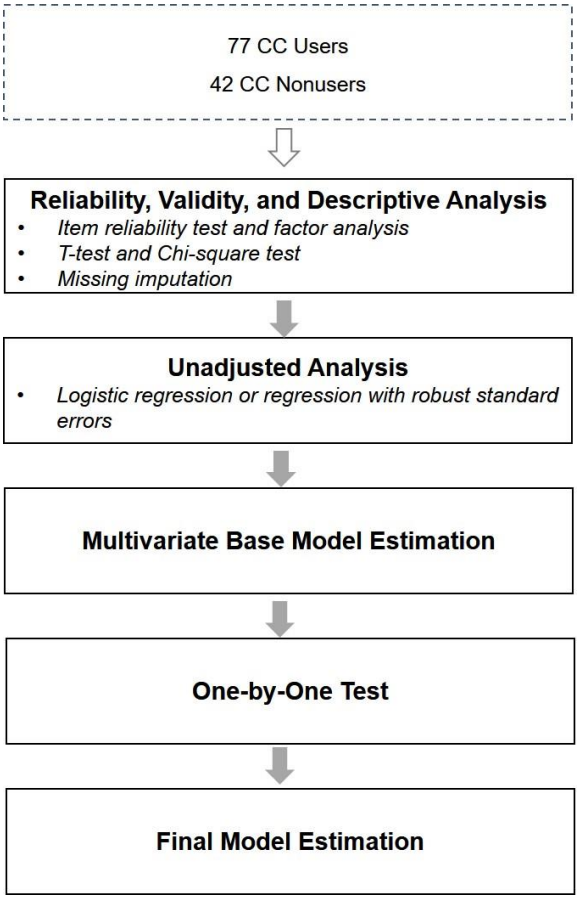


Figure 5

Modeling Process

5. RESULTS

5.1. DESCRIPTIVE FINDINGS

5.1.1. Respondent Characteristics

The respondents of CC users (*N*=77) lived in 11 cities from three counties in northeast Ohio, namely, Portage county, Stark county, and Summit county (Table 4 and 5). The majority of CC users lived in Portage county (68.8%), especially in the city of Kent (50.6%). Nonusers (*N*=42) lived in eight cities from three counties (Portage county, Stark county, and Summit county), and most of them lived in the Summit county (42.9%) (Table 4 and 5).

Table 4

Characteristics of Study Areas

County	City	N (%)	City Classification[a]	Population Density[b]	Poverty Rate[c]
Portage County	Kent	39 (50.6%)	13 (29.367)	3202.5	35.0%
	Ravenna	13 (16.9%)	13 (11,635)	2066.6	21.4%
	Randolph	1 (1.3%)	12 (5,504)	755.2	7.3%
Stark County	Canton	6 (7.8%)	14 (72,668)	2854.2	32.4%
	Massillon	4 (5.2%)	13 (32,224)	1734.3	19.3%
	North Canton	1 (1.35)	13 (17,437)	2724.5	7.5%
Summit County	Akron	4 (5.2%)	14 (198,492)	3199.9	26.7%
	Cuyahoga Falls	2 (2.6%)	13 (49,316)	1922.7	11.4%
	Stow	4 (5.2%)	13 (34,741)	2032.8	21.6%
	Hudson	2 (2.6%)	13 (22,323)	869.6	3.3%
	Mogadore village	1 (1.3%)	12 (3,925)	1878.0	12.8%

[a]City classification: 11= Pop. < 2,500 (rural area); 12= 2,500 ≤ Pop. ≤ 9.999 (non-core area); 13= 10,000 ≤ Pop. ≤ 49.999 (micropolitan area); 14= 50,000 ≤ Pop. (metropolitan area)
[b]Population density: population density per square mile of land area (2014 population estimates)
[c]Poverty rate: individuals below the official poverty line
Source: 2014 American Community Survey 5-Year Estimates

Table 5

Respondents in Study Areas

County	City	Users (N = 77)	Nonusers (N = 42)
		N (%)	N (%)
Portage County	Kent	39 (50.6%)	7 (16.7%)
	Ravenna	13 (16.9%)	2 (4.8%)
	Randolph	1 (1.3%)	-
Stark County	Canton	6 (7.8%)	8 (19.0%)
	Massillon	4 (5.2%)	5 (11.9%)
	North Canton	1 (1.35)	2 (4.8%)
Summit County	Akron	4 (5.2%)	15 (35.7%)
	Cuyahoga Falls	2 (2.6%)	2 (4.8%)
	Stow	4 (5.2%)	1 (2.4%)
	Hudson	2 (2.6%)	-
	Mogadore village	1 (1.3%)	-

In terms of respondent characteristics, the data presented in Table 6 indicate that the majority of respondents of the full sample were middle aged (M = 41.29, S.D. = 13.67), white (88.98%), and female (74.36%).[47] They were relatively well-educated (college graduate or more = 63.03%). From the result of the bivariate tests, four personal-socio-demographic variables were significantly different between CC users and nonusers at the 0.1 level. CC users were significantly more likely than nonusers to be female, older, white, and well-educated based on the original data. These findings regarding gender are consistent with previous research (Collom, 2008; Lasker et al., 2011).

In terms of personal-economic-demographics, the majority of total respondents were currently working (68.07%), and had moderate yearly household incomes with approximately half of the sample earning $50,000 or less per year (57.76%), which is

[47] Compared to the general U.S. population, the respondents of the present study were more likely to be female, white, and well-educated. US Census data (2014 American Community Survey 1-Year Estimates) showed as follows: median age 37.7 years; white 77.5%; female 50.8%; bachelor's degree 30.1%; and median household income $53,657.

below the national level of household median income ($51,939, in 2014). Most of them owned houses and cars. Also, there were more retired and disabled people among CC users (19.48%) than in nonusers (4.76%). CC users (a median household income in the $50,001 to $75,000 range) had higher incomes than nonusers (a median income of $25,001 to $50,000). Furthermore, CC users were significantly more likely to be a home owner or a car owner than nonusers.

Table 6

Respondent Characteristics: Descriptive Statistics and Bivariate Tests

Characteristic		Full Sample (*N* = 119)	CRTB CC Users (*N* = 77)	Nonusers living around CRTB area (*N* = 42)	Bivariate Test
Personal-Socio-demographic	*Sex(%)*				$\chi 2$= **10.185** (*p*=0.001)
	Male	30 (26.64%)	12 (16%)	18 (42.86%)	
	Female	87 (74.36%)	63 (84%)	24 (57.14%)	
	Missing data	2	2	-	
	Age (*M*, S.D.)	41.29, 13.67	45.82, 12.24	32.90, 12.25	t= **-5.442** (*p*<0.001)
	Missing data	2	1	1	
	Race (%)				
	[Original data]				
	White	105 (88.98 %)	71 (93.42%)	34 (80.95%)	
	Black or African American	7 (5.93%)	-	7 (16.67%)	
	Asian	1 (0.85 %)	1 (1.32%)	-	
	American Indian or Alaskan Native	-	-	-	
	Native Hawaiian or other Pacific Islander	-	-	-	
	Hispanic, Latino, or Spanish origin	1 (0.85%)	1 (1.32%)	-	
	Other	4 (3.39%)	3 (3.95%)	1 (2.38%)	
	Missing data	1	1	-	
	[Recoded data]				$\chi 2$= **4.29** (*p*= 0.038)
	White	105 (88.98 %)	71 (93.42%)	34 (80.95%)	
	Non-white	13 (11.02%)	5 (6.58%)	8 (19.05%)	
	Education (%)				
	[Original data]				
	Never attended school or only kindergarten	-	-	-	
	Grades 1 through 11	1 (0.84%)	-	1 (2.38%)	
	Grade 12 or GED (High school graduate)	10 (8.40%)	5 (6.49%)	5 (11.9%)	
	College 1 year to 3 year (Some college or technical school)	33 (27.73%)	21 (27.27%)	12 (28.57%)	
	College 4 year or more (College graduate)	46 (38.66%)	23 (29.87%)	23 (54.76%)	
	Graduate school or higher	29 (24.37%)	28 (36.36%)	1 (2.38%)	
	Missing data	-	-	-	
	[Recoded data]				$\chi 2$= 0.9638 (*p*=0.326)
	College graduate or more	75 (63.03%)	51 (66.23%)	24 (57.14%)	
	Less than college graduate	44 (36.97%)	26 (61.90%)	18 (42.86%)	

Table 6 (Continued)

Characteristic		Full Sample (*N* = 119)	CRTB CC Users (*N* = 77)	Non-Users living around CRTB area (*N* = 42)	Bivariate Test
Personal – Economic	*Employment (%)*				
	[Original data]				
	Full-time wage and salary worker	39 (32.77%)	25 (32.47%)	14 (33.33%)	
	Part-time wage and salary worker	27 (22.69%)	16 (20.78%)	11 (26.19%)	
	Self-employed	15 (12.61%)	11 (14.29%)	4 (9.52%)	
	Unemployed, looking for work	11 (9.24%)	2 (2.60%)	9 (21.43%)	
	Unemployed, NOT looking for work	5 (4.20%)	3 (3.90%)	2 (4.76%)	
	Retired	7 (5.88%)	7 (9.09%)	-	
	Disabled, not able to work	10 (8.40%)	8 (10.39%)	2 (4.76%)	
	Other	5 (4.20%)	5 (6.49%)	-	
	Missing data	-	-	-	
	[Recoded data]				$\chi 2$= 0.0287 (p= 0.865)
	Currently working	81 (68.07%)	52 (67.53%)	29 (69.05%)	
	Not working	38 (31.93%)	25 (32.47%)	13 (30.95%)	
	Household pre-tax income (%)				$\chi 2$= **8.917** (p= 0.063)
	$25,000 or less	28 (24.14%)	13 (17.57%)	15 (35.71%)	
	$25,001 - $50,000	39 (33.62%)	23 (31.08%)	16 (38.1%)	
	$50,001 - $75,000	25 (21.55%)	20 (27.03%)	5 (11.9%)	
	$75,001 - $100,000	12 (10.34%)	8 (10.81%)	4 (9.52%)	
	$100,001 or more	12 (10.34%)	10 (13.51%)	2 (4.76%)	
	Missing data	3	3	-	
	Home ownership (%)				$\chi 2$= **14.163** (p< 0.001)
	Yes	75 (63.03%)	58 (75.32%)	17 (40.48%)	
	No	44 (36.97%)	19 (24.68%)	25 (59.52%)	
	Missing data	-	-	-	
	Car ownership (%)				$\chi 2$= **6.425** (p=0.011)
	Yes	99 (83.19%)	69 (89.61%)	30 (71.43%)	
	No	20 (16.81%)	8 (10.39%)	12 (28.57%)	
	Missing data	-	-	-	
	Number of cars in household (M, S.D.*)*	1.89, 1.21	1.99, 1.11	1.74, 1.36	t= -1.050 (p=0.296)
	Missing data	6	6		

Table 6 (Continued)

Characteristic		Full Sample (*N* = 119)	CRTB CC Users (*N* = 77)	Non-Users living around CRTB area (*N* = 42)	Bivariate Test
	Marital status (%)				
	[Original data]				
	Currently married	66 (55.46%)	52 (67.53%)	14 (33.33%)	
	Widowed	2 (1.68%)	2 (2.6%)	-	
	Divorced	12 (10.08%)	10 (12.99%)	2 (4.76%)	
	Separated	1 (0.84%)	-	1 (2.38%)	
	Single, Never Married	38 (31.93%)	13 (16.88%)	25 (59.52%)	
	Missing data	-	-	-	
	[Recoded data]				$\chi2$=**12.868** (*p*<0.001)
	Currently married	66 (55.46%)	52 (67.53%)	14 (33.33%)	
	Not married	53 (44.54%)	25 (32.47%)	28 (66.67%)	
	Number of children in the household (%)				
	[Original data]				
	0	70 (59.32%)	43 (56.58%)	27 (64.29%)	
	1	24 (20.34%)	17 (22.37%)	7 (16.67%)	
	2	18 (15.25%)	13 (17.11%)	5 (11.9%)	
	3	4 (3.39%)	3 (3.95%)	1 (2.38%)	
	4 or more	2 (1.69%)	-	2 (4.76%)	
	Missing data	1	1	-	
	[Recoded data]				$\chi2$=0.800 (*p*= 0.371)
	Having children in the household	49 (40.68%)	34 (43.42%)	15 (35.71%)	
	No children in the household	70 (59.32%)	43 (56.58%)	27 (64.29%)	
	Housing type (%)				
	[Original data]				
	A mobile home	2 (1.69%)	-	2 (4.76%)	
Household/ Community	A one-family house detached from any other house	84 (71.19%)	61 (80.26%)	23 (54.76%)	
	A townhouse or townhome	6 (5.08%)	3 (3.95%)	3 (7.14%)	
	A building with 2 apartments or units	7 (5.93%)	2 (2.63%)	5 (11.9%)	
	A building with 3 or 4 apartments or units	9 (7.63%)	5 (6.58%)	4 (9.52%)	
	A building with 5 or more apartments or units	10 (8.47%)	5 (6.58%)	5 (11.9%)	
	Don't know / Not sure	-	-	-	
	Missing data	1	1	-	
	[Recoded data]				$\chi2$= **8.577** (*p*=0.003)
	Single family housing	84 (71.19%)	61 (80.26%)	23 (54.76%)	
	Others	34 (28.81%)	15 (19.74%)	19 (45.24%)	
	Commute mode (%)				
	[Original data]				
	Driving alone	77 (70.00%)	49 (72.06%)	28 (66.67%)	
	Driving with others	6 (5.45%)	5 (7.35%)	1 (2.38%)	
	Walking	10 (9.09%)	3 (4.41%)	7 (16.67%)	
	Bicycling	3 (2.73%)	1 (1.47%)	2 (4.76%)	
	Using public transit	4 (3.64%)	3 (4.41%)	1 (2.38%)	
	Others	10 (9.09%)	7 (10.29%)	3 (7.14%)	
	Missing data	9	9	-	
	[Recoded data]				$\chi2$= 0.360 (*p*=0.549)
	Driving alone	77 (70.00%)	49 (72.06%)	28 (66.67%)	
	Others	33 (30.00%)	19 (27.74%)	14 (33.33%)	
	Length of residency (M, S.D.*)*	11.74, 11.71	12.29, 10.20	10.77, 14.13	t= -0.669 (*p*=0.505)
	Missing data	1	1	-	

Table 6 (Continued)

Characteristic		Full Sample (*N* = 119)	CRTB CC Users (*N* = 77)	Non-Users living around CRTB area (*N* = 42)	Bivariate Test
Household/ Community	*Population size by city/town (%)*				
	[Original data]				
	Pop. < 2,500 (rural area)	-	-	-	
	2,500 ≤ Pop. ≤ 9.999 (non-core area)	1 (0.84%)	1 (1.30%)	-	
	10,000 ≤ Pop. ≤ 49.999 (micropolitan area)	85 (71.43%)	66 (85.71%)	19 (45.24%)	
	50,000 ≤ Pop. (metropolitan area)	33 (27.73%)	10 (12.99%)	23 (54.76%)	
	Missing data	-	-	-	
	[Recoded data]				$\chi 2$= **23.665**(p<0.001)
	Metropolitan atrea	33 (27.73%)	10 (12.99%)	23 (54.76%)	
	Other areas	86 (72.27%)	67 (87.01%)	19 (45.24%)	
	Population density (M, S.D.*)*	2727.02, 646.69	2690.04, 693.96	2794.82, 551.03	t = 0.844 (p=0.401)
	Missing data	-	-	-	
	Poverty rate by city (M, S.D.*)*	28.14, 9.87	29.04, 10.49	26.50, 8.49	t= -1.343 (p=0.182)
	Missing data	-	-	-	

From the results of the household/community demographic variables, three variables were significantly different between users and nonusers. CC users were significantly more likely to be married, live in single family housing, and live in smaller towns based on the original data.

5.1.2. Community Currency Activities and Satisfaction

The majority of CC users participated in CC events every two to three months or less (51.32%) and exchanged two or fewer kinds of goods and services in a typical month (51.95%) during the past year (Table 7). Items most commonly exchanged were *use or reuse of items*, followed by *tutoring, consultation, and personal services* (Table 8). The majority of users exchanged two or fewer times (58.44%) and had two or less trading partners (62.34%) in a typical month during the past year (Table 7). Almost ninety percent of members had credits, and about eight percent of them had debits in

their accounts (Table 7). Only one member (1.3%) had a balanced account (no credits or debits).

Table 7

Descriptive Statistics of Community Currency Activities and Satisfaction

Variable	Definition	*N*	%	Cum. %
Participation in CC events	"How often did you attend Community Currency social events like potlucks, dances, Earth Day celebrations, etc.			
	[Original data]			
	11= Less than once a year	13	17.11	17.11
	12= At least once a year	7	9.21	26.32
	13= Once every four to six months	8	10.53	36.84
	14= Once every two to three months,	11	14.47	51.32
	15= Once a month	19	25.00	76.32
	16= More than once a month	18	23.68	100.00
	Missing	1		
	[Recoded data]			
	Once a month or more	37	48.68	
	Less than once a month	38	51.32	
Number of kinds of goods and services	"During the past year, in a typical month, how many kinds of goods and services did you exchange with Community Currency?"			
	[Original data]			
	11= 0 or in some months	13	16.88	16.88
	12= 1 to 2	27	35.06	51.95
	13= 3 to 4	17	22.08	74.03
	14= 5 to 6	12	15.58	89.61
	15= 7 to 8	4	5.19	94.81
	16= 9 to 10	1	1.3	96.1
	17= 11 or more	3	3.9	100
	Missing	-		
	[Recoded data]			
	3 or more	40	48.05	
	Less than 3	37	51.95	
Average number of exchanges	"During the past year, in a typical month, what would you estimate as the average number of exchanges (either giving or receiving) that you did with Community Currency?"			
	[Original data]			
	11= 0 or in some months	17	22.08	22.08
	12= 1 to 2	28	36.36	58.44
	13= 3 to 4	16	20.78	79.22
	14= 5 to 6	11	14.29	93.51
	15= 7 to 8	4	5.19	98.7
	16= 9 to 10	-	-	-
	17= 11 or more	1	1.3	100
	Missing	-		
	[Recoded data]			
	3 or more	45	41.56	
	Less than 3	31	58.44	

Table 7 (Continued)

Variable	Definition	*N*	%	Cum. %
Number of trading partners	"During the past year, in a typical month, how many trading partners did you have?" [Original data]			
	11= 0 or in some months	19	24.68	24.68
	12= 1 to 2	29	37.66	62.34
	13= 3 to 4	15	19.48	81.82
	14= 5 to 6	10	12.99	94.81
	15= 7 to 8	2	2.6	97.4
	16= 9 to 10	1	1.3	98.7
	17= 11 or more	1	1.3	100
	Missing	-		
	[Recoded data]			
	3 or more	48	37.66	
	Less than 3	29	62.34	
CC account balance	"What was your last account balance in Community Currency?" [Original data]			
	11= 101 or more debits	7	9.09	9.09
	12= 51 to 100 debits	7	9.09	18.18
	13= 21 to 50 debits	15	19.48	37.66
	14= 1 to 20 debits	41	53.25	90.91
	15= Balanced (no credits or debits)	1	1.3	92.21
	16= 1 to 20 credits	5	6.49	98.7
	17= 21 to 50 credits	1	1.3	100
	18= 51 to 100 credits	-	-	-
	19= 101 or more credits	-	-	-
	Missing	-	-	-
	[Recoded data]			
	Balanced (14, 15, 16)	47	61.04	
	Unbalanced (others)	30	38.96	

Table 7 (Continued)

Variable	Definition	N	Mean	S.D.	Min	Max
Length of Membership	"How long have you been involved in the Community Currency program?"	75	2.17	1.50	0	6
Time credits (TC) to use for obtaining services	"During the past year, how many time credits did you use to obtain services in the TimeBank?"	75	20.51	36.83	0	211.5
TC for obtaining services available in the market	"During the past year, how many time credits did you use to obtain services that you would normally pay U.S. currency to receive?"	75	17.39	31.19	0	168.25
TC for obtaining services not available on the market	"During the past year, how many time credits did you use to obtain services that would NOT be available for any amount of U.S. currency?"	73	4.04	9.06	0	50
Time credits (TC) to receive for providing services	"During the past year, how many time credits were recorded to your account for services you provided?"	73	46.21	156.23	0	1323
TC for offering services available on the market	"During the past year, how many time credits did you receive for services you also offer, or previously offered, on the market economy?"	74	12.29	23.89	0	104
TC for offering services not available on the market	"During the past year, how many time credits did you receive for services you have NEVER been paid in U.S. currency for?"	73	35.41	155.93	0	1323
Time credits (TC) to receive for giving goods	"During the past year, if you gave away goods for time credits, how many time credits did you receive for these goods?"	63	8.52	16.88	0	120
Time credits (TC) to use for obtaining goods	"During the past year, if you acquired goods for time credits, how many time credits did you use for these goods?"	64	8.06	13.94	0	77.5
Social satisfaction with CC[a]	The average of social satisfaction with CC items (1=Strongly disagree through 5= Strongly agree)	77	4.02	0.82	1	5
Economic satisfaction with CC[a]	The average of economic satisfaction with CC items (1=Strongly disagree through 5= Strongly agree)	77	4.00	0.89	1	5

[a] composite score

Table 8

Exchanging Goods and Services with CC

Items	*N*	%
1. Use or reuse of items	46	13.3%
2. Tutoring, consultation, and personal services	32	9.2%
3. Events and program support	30	8.6%
3. Food preparation and service	30	8.6%
5. Arts and crafts production	28	8.1%
6. Health and wellness	26	7.5%
7. Transportation and moving	25	7.2%
8. Cleaning, light tasks and errands	22	6.3%
9. Entertainment and social contact	20	5.8%
10. Rentals of items	19	5.5%
11. Computers and technology	16	4.6%
12. Beauty and spa	12	3.5%
12. Construction, installation, and maintenance	12	3.5%
12. Office and administrative support	12	3.5%
13. Others	17	4.9%
Total	347	100%

Users had high ratings on all questions regarding *social satisfaction* and *economic satisfaction with CC* (total mean = 4.02 and 4.0 out of 5.0, respectively) (Table 9 and 10). They strongly agreed that Community Currency had helped them establish relationships of trust for ongoing or future exchanges of items, goods, and services (mean = 4.36) (Table 9), and Community Currency had given them trading partners for their goods and services that they otherwise would not have had (mean = 4.26) (Table 10).

Table 9

Descriptive Statistics of Social Satisfaction with CC

Items	CC Users				
	N	Mean	S.D.	Min	Max
1. "Community Currency has helped me increase my circle of friends."	77	4.06	1.00	1	5
2. "Community Currency has helped me develop my self-confidence."	77	3.62	1.10	1	5
3. "Community Currency has given me the ability to help people."	77	4.26	0.94	1	5
4. "Community Currency has helped me establish relationships of trust for ongoing or future exchanges of items, goods, and services."	77	4.36	0.86	1	5
5. "I consciously try to go to the stores or practitioners who accept Community Currency."	76	3.82	1.16	1	5
6. "After participating in the Community Currency program, I am more willing to stay in the current community than before."	77	4.08	1.10	1	5
7. "After participating in the Community Currency program, I am more satisfied with my life than before."	77	3.94	0.98	1	5
Total	77	4.02	0.82	1	5

* p<.1, ** p<.05, *** p<.01
Measured along a 5-point scale from 1 = strongly disagree to 5 = strongly disagree
A higher score means a higher level of satisfaction with CC.

Table 10

Descriptive Statistics of Economic Satisfaction with CC

Items	CC Users				
	N	Mean	S.D.	Min	Max
1. "Community Currency has helped me to use skills I would not have otherwise used."	77	3.74	1.15	1	5
2. "Community Currency has given me access to goods and/or services that I would not have otherwise been able to acquire."	77	3.99	1.09	1	5
3. "Community Currency has given me trading partners for giving my goods and/or services that I otherwise would not have had."	77	4.26	0.97	1	5
4. "Community Currency has helped me dispose of unneeded or unused items."	77	4.00	1.25	1	5
Total	77	4.00	0.89	1	5

* p<.1, ** p<.05, *** p<.01
Measured along a 5-point scale from 1 = strongly disagree to 5 = strongly disagree
A higher score means a higher level of satisfaction with CC.

5.1.3. Neighborhood Environments

5.1.3.1. Objective Destination Accessibility

There was no statistically significant difference between CC users and nonusers even though *destination accessibility* measured by Walk Score had higher ratings among nonusers.

Table 11

Descriptive Statistics and Bivariate Test: "Destination Accessibility"

Item	CC Users			CC Nonusers			T-test	
	N	Mean	S.D.	*N*	Mean	S.D.	t	Pr(|T| > |t|)
Destination Accessibility[a]	71	30.68	25.47	42	36.05	21.00	1.15	0.25

* p<.1, ** p<.05, *** p<.01
[a] Walk Score, measured on a scale from 0 to 100
A higher score means a higher level of objective destination accessibility.

5.1.3.2. Perceived Neighborhood Walkability

Access to Services between CC Users and Nonusers

CC nonusers were significantly more likely to agree that stores were within easy walking distance from their home compared to CC users (mean, 3.95 vs. 3.12; p=0.002). The perception of overall *access to services* was consistently higher among nonusers (mean, 3.79 vs. 3.33; p= 0.073).

Table 12

Descriptive Statistics and Bivariate Test: "Access to Services"

Items	CC Users			CC Nonusers			T-test	
	N	Mean	S.D.	*N*	Mean	S.D.	t	Pr(|T| > |t|)
1. "Stores are within easy walking distance of my home."	76	3.12	1.50	42	3.95	1.17	**3.12*** **	0.002
2. "There are many places to go within easy walking distance of my home."	75	3.21	1.49	42	3.52	1.37	1.11	0.268
3. "It is easy to walk to a transit stop from my home."	75	3.60	1.59	42	3.88	1.33	0.97	0.335
Total	77	3.33	1.41	42	3.79	1.07	**1.81***	0.073

* p<.1, ** p<.05, *** p<.01
Measured along a 5-point scale from 1 = strongly disagree to 5 = strongly disagree
A higher score means a higher level of accessibility.

Comforts in Walking

All four questions on perceptions of *comforts in walking* had higher ratings among nonusers, and there was no statistically significant difference between CC users and nonusers.

Table 13

Descriptive Statistics and Bivariate Test: "Comforts in Walking"

Items	CC Users			CC Nonusers			T-test	
	N	Mean	S.D.	*N*	Mean	S.D.	t	Pr(|T| > |t|)
1. "There are sidewalks on most of the streets."	77	3.30	1.60	42	3.76	1.45	1.56	0.121
2. "The sidewalks are well maintained (e.g., paved, even, and not a lot of cracks)."	73	2.88	1.21	42	3.14	1.26	1.12	0.266
3. "There are enough spaces (e.g., grass strip, trees) between the sidewalks and the vehicular roadways."	75	3.29	1.45	42	3.64	1.27	1.31	0.194
4. "There are enough benches and other places to rest along the streets."	75	2.13	1.20	42	2.21	1.46	0.32	0.747
Total	77	2.88	1.17	42	3.21	1.11	1.49	0.140

Measured along a 5-point scale from 1 = strongly disagree to 5 = strongly disagree
A higher score means a higher level of comforts in walking.

5.1.3.3. Crime Safety

All three items of *crime safety* were coded reversely. Namely, a higher score means a higher level of safety from crime. CC users were significantly more likely to indicate an overall low crime rate in their neighborhood, even at night, compared to nonusers (mean, 4.55 vs. 4.10; p= 0.004).

Table 14

Descriptive Statistics and Bivariate Test: "Crime Safety"

Items	CC Users			CC Nonusers			T-test	
	N	Mean	S.D.	*N*	Mean	S.D.	t	Pr(|T| > |t|)
1. "There is a high crime rate in my neighborhood."	77	4.36	0.83	42	3.98	1.26	**-2.02****	0.046
2. "The crime rate in my neighborhood makes it unsafe to go on walks during the day."	75	4.87	0.50	42	4.45	0.92	**-3.16*****	0.002
3. "The crime rate in my neighborhood makes it unsafe to go on walks at night."	77	4.43	0.98	42	3.86	1.35	**-2.65*****	0.009
Total	77	4.55	0.62	42	4.10	1.07	**-2.94*****	0.004

* p<.1, ** p<.05, *** p<.01
Reversely coded items.
Measured along a 5-point scale from 1 = strongly disagree to 5 = strongly disagree.

5.1.3.4. Place Dependence

All five items of *place dependence* for the neighborhood had significantly higher ratings among CC users. These five items included: the best place to do, no other compared place, more satisfaction, important meaning, and no substitute for their neighborhoods.

Table 15

Descriptive Statistics and Bivariate Test: "Place Dependence"

Items	CC Users			CC Nonusers			T-test	
	N	Mean	S.D.	*N*	Mean	S.D.	t	Pr(|T| > |t|)
1. "My neighborhood is the best place for what I like to do."	77	3.32	1.29	42	2.86	1.18	**-1.94***	0.054
2. "No other place can compare to my neighborhood."	76	2.88	1.15	42	2.21	1.20	**-2.96*****	0.004
3. "I get more satisfaction out of visiting my neighborhood than any other."	76	2.89	1.22	42	2.33	1.10	**-2.48****	0.015
4. "Doing what I do at my neighborhood is more important to me than doing it in any other place."	77	3.03	1.25	42	2.50	1.06	**-2.31****	0.023
5. "I wouldn't substitute any other area for doing the types of things I do at my neighborhood."	77	2.61	1.18	42	2.24	1.08	**-1.69***	0.093
Total	77	2.95	1.06	42	2.43	0.93	**-2.68*****	0.008

* p<.1, ** p<.05, *** p<.01
Measured along a 5-point scale from 1 = strongly disagree to 5 = strongly disagree.
A higher score means a higher level of place dependence.

5.1.3.5. Social Activity Places

CC users were more likely to report having more *social activity places* compared to nonusers; however, there was no statistically significant difference between the users and nonusers (Table 16). The majority of both users and nonusers visited social activity places once a week or less, by driving, and it usually took less than 10 minutes to get there.

Table 16

Descriptive Statistics and Bivariate Test: "Social Activity Places"

Variable		Definition	CC Users		CC Nonusers		Bivariate test
			%	*N*	%	*N*	
Social Activity Places	Number of social activity places	"How many places do you visit for socialization at least once a week?"		76		42	t = -0.291 (p= 0.772)
		0	9.2	7	11.9	5	
		1	34.2	26	38.1	16	
		2	30.3	23	28.6	12	
		3	**18.4**	14	7.1	3	
		4	**1.3**	1	7.1	3	
		5 or more place	**6.6**	5	7.1	3	
		Missing data		1		-	
	Frequency of social activity places	"How many times per week in total do you visit those places?"		76		42	t = -0.955 (p= 0.342)
		0	9.2	7	11.9	5	
		1	43.4	33	54.8	23	
		2	27.6	21	16.7	7	
		3	11.8	9	9.5	4	
		4	5.3	4	4.8	2	
		5 or more times per week	2.6	2	2.4	1	
		Missing data		1		-	
	Transportation mode	"How do you usually get there from home?"		69		37	χ2 = 3.507 (p= 0.477)
		11 = By walking	15.9	11	27.0	10	
		12 = By biking	1.5	1	2.7	1	
		13 = By driving	78.3	54	70.3	26	
		14 = By taking a bus	2.9	2	-	-	
		15 = Others	1.5	1	-	-	
		Missing data		8		5	
	The average time for arrival	How long does it usually take for you to get there from home by your chosen transport mode above?		69		37	t = -0.897 (p=0.372)
		1 = Less than 5 min.	23.2	16	29.7	11	
		2 = 5-10 min.	31.9	22	32.4	12	
		3 = 11-15 min.	24.6	17	24.3	9	
		4 = 16-20 min.	10.1	7	5.4	2	
		5 = Over 20min.	10.1	7	8.1	3	
		Missing data		8		5	

Note: The number and frequency of social activity places were treated as continuous variables.

Table 17

Summary of Neighborhood Environments: Descriptive Statistics and Bivariate Test

Variable		Definition	CC Users			CC Nonusers			T-test	
			N	Mean	S.D.	*N*	Mean	S.D.	t	P>|t|
Neighborhood Environment	**Objective Walkability**									
	Destination accessibility	Walk Score	71	30.68	25.47	42	36.05	21.00	1.15	0.25
	Perceived Walkability									
	Access to services[ab]	The average of proximity to, and ease of access to, nonresidential places and a transit stop	77	3.33	1.41	42	3.79	1.07	**1.81***	0.07
	Comforts in walking[ab]	The average of neighborhood comforts in walking	77	2.88	1.17	42	3.21	1.11	1.49	0.14
	Crime Safety[ab]	The inverse average of the neighborhood crime rate	77	4.55	0.62	42	4.10	1.07	**-2.94*****	0.004
	Place Dependence[ab]	The average of neighborhood place dependence items	77	2.95	1.06	42	2.43	0.93	**-2.68*****	0.008
	Social Activity Places									
	Number of social activity places	"How many places do you visit for socialization at least once a week?"	76	1.88	1.24	42	1.81	1.37	-0.29	0.77
	Frequency of social activity places	"How many times per week in total do you visit those places?"	76	1.68	1.13	42	1.48	1.13	-0.96	0.34

[a] Measured along a 5-point scale from 1 = strongly disagree to 5 = strongly disagree
[b] Composite score

5.1.4. Community Attachment

5.1.4.1. Neighborhood Cohesion

CC users showed higher *neighborhood cohesion* levels than nonusers based on the eight questions used to capture *neighborhood cohesion*. These differences between CC users and nonusers were statistically significant ($p< 0.1$) with regard to fulfilling their needs, feeling a sense of belonging, having a say about what goes on in their neighborhood, being good at influencing each other, feeling connected, and having a good bond with others (Table 18).

Table 18

Descriptive Statistics and Bivariate Tests: "Neighborhood Cohesion"

Items	CC Users			CC Nonusers			T-test	
	N	Mean	S.D.	*N*	Mean	S.D.	t	Pr(|T| > |t|)
1. "I can get what I need in this neighborhood."	77	2.73	0.82	42	2.76	0.91	0.21	0.833
2. "This neighborhood helps me fulfill my needs."	77	2.77	0.81	42	2.48	0.99	**-1.72***	0.088
3. "I feel like a member of this neighborhood."	76	2.76	0.99	42	2.52	1.04	-1.23	0.220
4. "I belong in this neighborhood."	76	2.82	0.98	42	2.48	1.02	**-1.78***	0.077
5. "I have a say about what goes on in my neighborhood."	77	2.27	1.02	42	1.74	0.96	**-2.78****	0.006
6. "People in this neighborhood are good at influencing each another."	77	2.45	0.91	42	2.14	0.9	**-1.79***	0.076
7. "I feel connected to this neighborhood."	77	2.73	1.02	42	2.38	0.94	**-1.82***	0.071
8. "I have a good bond with others in this neighborhood."	77	2.68	1.04	42	2.33	0.95	**-1.76***	0.081
Total	77	2.66	0.82	42	2.36	0.81	**-1.92***	0.057

* p<.1, ** p<.05, *** p<.01
Measured along a 4-point scale from 1 = not at all to 4 = completely; higher scores show better neighborhood cohesion.

5.1.4.2. Community Support

Community support levels were consistently higher among CC users: (1) being actively involved in community issues and activities, (2) doing their best to enhance the development of their neighborhood, and (3) being willing to provide financial support for the development of their community were all significant at the 0.1 level (Table 19).

Table 19

Descriptive Statistics and Bivariate Tests: "Community Supports"

Items	CC Users			CC Nonusers			T-test	
	N	Mean	S.D.	*N*	Mean	S.D.	t	Pr(|T| > |t|)
1. "I am actively involved in community issues and activities."	77	2.3	0.97	42	1.55	0.83	**-4.22*** **	< 0.001
2. "I would do my best to enhance the development of my neighborhood."	77	2.91	0.89	42	2.43	1.09	**-2.60** **	0.011
3. "I would be willing to provide financial support for the development of my community."	77	2.3	0.84	42	1.71	0.71	**-3.81*** **	< 0.001
Total	77	2.51	0.8	42	1.89	0.73	**-4.17*** **	< 0.001

* p<.1, ** p<.05, *** p<.01
Measured along a 4-point scale from 1 = not at all to 4 = completely.
Higher scores show higher levels of community support.

5.1.4.3. Local Shopping Loyalty

CC users were more likely to report higher *local shopping loyalty* levels, compared to nonusers on all questions. Of the 10 questions on *local shopping loyalty*, eight had significantly higher ratings ($p < 0.05$) among CC users (Table 20). For two items asking "I will increase my interest in local stores when more goods/services are made available through them" (mean, CC users= 3.04, nonusers= 2.83) and "I shop locally even when the selection/variety of goods is poor" (mean, CC users= 2.08, nonusers= 1.93), there was no difference between CC users and nonusers. This could be interpreted to mean both CC users and nonusers will frequently use local stores when their quality is improved. CC users strongly agreed that they shopped at local stores because it was important to help their communities and was an enjoyable experience (mean, 3.13 and 3.17, respectively).

Table 20

Descriptive Statistics and Bivariate Tests: "Local Shopping Loyalty"

Items	CC Users			CC Nonusers			T-test	
	N	Mean	S.D.	*N*	Mean	S.D.	t	Pr(|T| > |t|)
1. "I shop outside my local retail area before looking to see what is offered locally." [a]	77	3.09	0.54	42	2.69	0.98	**-2.88*****	0.005
2. "I shop locally because the convenience outweighs the other advantages of shopping outside the community."	77	2.90	0.55	42	2.48	0.86	**-3.23*****	0.002
3. "I will increase my interest in local stores when more goods/services are made available through them."	76	3.04	0.66	42	2.83	0.88	-1.44	0.154
4. "I will pay slightly more for products if I can buy them locally."	77	2.87	0.64	42	2.4	0.94	**-3.21*****	0.002
5. "I shop at local stores because it is important to help my community."	77	3.13	0.61	42	2.38	0.91	**-5.34*****	< 0.001
6. "I shop locally to support the local merchants and business district."	77	3.06	0.61	42	2.36	0.93	**-4.98*****	< 0.001
7. "Shopping at local stores is an enjoyable experience."	77	3.17	0.71	42	2.62	0.88	**-3.69*****	< 0.001
8. "Because I am more familiar with local stores, I prefer shopping locally rather than out of town."	77	2.87	0.73	42	2.5	0.99	**-2.32****	0.022
9. "I shop locally even when the selection/variety of goods is poor."	77	2.08	0.72	42	1.93	0.75	-1.07	0.288
10. "I am loyal to my local shopping area."	77	2.78	0.75	42	2.33	0.87	**-2.91*****	0.004
Total	77	2.9	0.45	42	2.45	0.67	**-4.33*****	< 0.001

* p<.1, ** p<.05, *** p<.01
[a] A reverse-coded item
Measured along a 4-point scale from 1 = not at all to 4 = completely
Higher scores show higher levels of local shopping loyalty.

5.1.5. Quality of Life[48]

5.1.5.1. Physical and Material Well-Being

CC users presented significantly higher satisfaction with their material comforts and health than nonusers (Table 21).

Table 21

Descriptive Statistics and Bivariate Tests:
"Physical and Material Well-Being"

Items	CC Users			CC Nonusers			T-test	
	N	Mean	S.D.	*N*	Mean	S.D.	t	Pr(|T| > |t|)
1. "Material comforts – desirable home, food, conveniences, security"	77	5.84	0.95	42	4.48	1.5	**-6.09*** **	< 0.001
2. "Health - being physically fit and vigorous"	77	5.1	1.35	42	4.24	1.91	**-2.87*** **	0.005
Total	77	5.47	1.01	42	4.36	1.51	**-4.81*** **	< 0.001

* p<.1, ** p<.05, *** p<.01
Measured along a 7-point scale from 1 = terrible to 7 = delighted

[48] Higher scores show higher levels of QOL.

5.1.5.2. Relations with Other People

Overall, CC users showed significantly higher satisfaction with their relationships with other people than nonusers (total mean = 5.75 and 4.82 in the CC users and nonusers, respectively) except for *having and rearing children* (Table 22).

Table 22

Descriptive Statistics and Bivariate Tests: "Relations with Other People"

Items	CC Users			CC Nonusers			T-test	
	N	Mean	S.D.	*N*	Mean	S.D.	t	Pr(|T| > |t|)
1. "Relationships with parents, siblings & other relatives- communicating, visiting, helping"	77	5.43	1.45	42	4.43	1.5	**-3.56*** **	0.001
2. "Having and rearing children"	71	5.72	1.54	19	5.95	1.13	0.60	0.547
3. "Close relationships with spouse or significant other"	75	6.03	1.47	41	4.93	1.79	**-3.56*** **	0.001
4. "Close friends - sharing views, interests, activities"	77	5.92	1.07	42	4.69	1.77	**-4.72*** **	< 0.001
Total	77	5.75	0.97	42	4.82	1.22	**-4.54*** **	< 0.001

* p<.1, ** p<.05, *** p<.01
Measured along a 7-point scale from 1 = terrible to 7 = delighted.

5.1.5.3. Social, Community, and Civic activities

As expected, both items on *social, community, and civic activities* (helping others and participation in organizations) had significantly higher ratings among CC users (Table 23).

Table 23

Descriptive Statistics and Bivariate Tests: "Social, Community, and Civic activities"

Items	CC Users			CC Non-Users			T-test	
	N	Mean	S.D.	*N*	Mean	S.D.	t	Pr(|T| > |t|)
1. "Helping and encouraging others, volunteering, giving advice"	76	5.97	0.94	42	4.55	1.47	**-6.43*** **	< 0.001
2. "Participating in organizations and public affairs"	76	5.55	1.09	42	4	1.5	**-6.47*** **	< 0.001
Total	76	5.76	0.93	42	4.27	1.38	**-6.98*** **	< 0.001

* p<.1, ** p<.05, *** p<.01
Measured along a 7-point scale from 1 = terrible to 7 = delighted.

5.1.5.4. Personal Development and Fulfillment

CC users were significantly more likely to report satisfaction with learning, knowing themselves, expressing themselves, and working than nonusers (Table 24). CC users, particularly, were significantly more likely to be satisfied with their work (mean, 5.39 vs. 4.29; $p< 0.001$) and expression of themselves (mean, 5.7 vs. 4.83; $p< 0.001$), compared to nonusers.

Table 24

Descriptive Statistics and Bivariate Tests:
"Personal Development and Fulfillment"

Items	CC Users			CC Non-Users			T-test	
	N	Mean	S.D.	*N*	Mean	S.D.	t	Pr(|T| > |t|)
1. "Learning - attending school, improving understanding, getting additional knowledge"	77	5.74	1.2	42	5.02	1.37	**-2.96*** **	0.004
2. "Understanding yourself and knowing your assets and limitations - knowing what life is about "	77	5.9	1.11	42	5.14	1.34	**-3.29*** **	0.001
3. "Work - job or in home "	77	5.39	1.25	42	4.29	1.73	**-4.01*** **	< 0.001
4. "Expressing yourself creatively"	77	5.7	1.1	42	4.83	1.41	**-3.71*** **	< 0.001
Total	77	5.71	0.94	42	4.84	1.2	**-4.36*** **	< 0.001

* p<.1, ** p<.05, *** p<.01
Measured along a 7-point scale from 1 = terrible to 7 = delighted.

5.1.5.5. Recreation

CC users were significantly more likely to be satisfied with their recreation, related to quality of life, compared to nonusers (total mean = 5.67 and 4.92 in each sample). All three recreation items were consistently higher among CC users. Specifically, CC users expressed high satisfaction with reading, listening to music, etc., compared to nonusers (mean, 6.21 vs. 5.6; p=0.007).

Table 25

Descriptive Statistics and Bivariate Tests: "Recreation"

Items	CC Users			CC Non-Users			T-test	
	N	Mean	S.D.	*N*	Mean	S.D.	t	Pr(|T| > |t|)
1. "Socializing - meeting other people, doing things, parties, etc."	77	5.47	1.28	42	4.52	1.78	**-3.33*** **	0.001
2. "Reading, listening to music, or watching sports, other entertainment"	77	6.21	0.94	42	5.6	1.48	**-2.76*** **	0.007
3. "Participating in active recreation"	77	5.36	1.43	42	4.64	1.57	**-2.53** **	0.013
Total	77	5.67	0.96	42	4.92	1.32	**-3.56*** **	0.001

* p<.1, ** p<.05, *** p<.01
Measured along a 7-point scale from 1 = terrible to 7 = delighted.

5.2. HYPOTHESIS TESTING

Multiple regression analyses were carried out to access the overall associations among neighborhood environments, CC activities, community attachment, and quality of life. Primary hypotheses 1-1 (PH1-1, among the full sample) and 1-2 (PH1-2, among CC users) were explored through the logistic regression to understand the relationship between neighborhood environments and CC activities. Primary hypothesis 2 (PH2, among CC users) was examined through the regression with robust standard errors to determine the association between CC activities and community attachment factors to deal with the violations of OLS assumptions (heteroscedasticity, residuals' normality, and multicollinearity. Primary hypothesis 3 (PH3, among CC users) was posed to determine if CC activities would be determinants of quality of life factors. Their relationships were analyzed through the regression with robust standard errors. Secondary hypothesis 1 (SH1) related to the neighborhood environments' role on the community attachment factors was examined through the regression with robust standard errors after checking the following OLS assumptions: heteroscedasticity, residuals' normality, and multicollinearity (SH1, among the full sample). To determine the role of community attachment factors on quality of life factors (SH2-1, among the full sample), the regression with robust standard errors was employed. Finally, to understand if CC membership or the socio-economic status had an effect on quality of life factors, the regression with robust standard errors was used (SH2-2 and SH2-3, among the full sample).

5.2.1. Primary Hypothesis 1-1: Correlate between Neighborhood Environments and CC Participation

5.2.1.1. Unadjusted Analyses

In the full sample, with the CC membership as an outcome variable, unadjusted analyses were conducted, including neighborhood environments, respondents' socio-demographic factors, and socioeconomic status. Perceived walkability included *access to services* and *comforts in walking*. Social environmental perception included *crime safety, place dependence*. Usage of social activity places included *number of social activity place*s and *frequency of social activity places*. The perceived walkability (such as *access to services* and *comforts in walking), crime safety*, and *place dependence* were used by averaging the sufficiently associated items which were all measured on a 5-point Likert scale (from 1="strongly disagree" to 5="strongly agree"). Each independent variable was assessed for its bivariate correlation by the unadjusted logistic regression analyses with the binary outcome variable, CC membership (1= CC member).

According to unadjusted bivariate analysis results (Table 26), *access to services* was negatively correlated with CC membership (OR=0.76, p=0.076). *Crime safety* and *place dependence* were positively related to CC membership (OR=1.93 and 1.65 at the 0.1 level, respectively). In terms of demographics, those who were female, older, white, married, had higher incomes, were home owners, lived in single family housing, and were car owners had a positive relationship with *CC membership* at the 0.1 level. People who lived in smaller cities (population of less than 50,000) were more likely to be CC members.

Table 26

(PH1-1) Bivariate Correlates of CC Membership: Unadjusted Logistic Regression (Total *N*= 119)

Class	Predictor	Coding Scheme	CC membership: member= 1(binary) (outcome)				
			N	OR	%[a]	S.E.	P>|z|
Neighborhood Environment	**Objective Walkability**						
	Destination accessibility	Walk Score, from 0 through 100, measured by Walkscore.com (continuous)	113	0.99	-0.9	0.01	0.250
	Perceived Walkability						
	Access to services[b]	"Stores are within easy walking distance of my home." "There are many places to go within easy walking distance of my home." "It is easy to walk to a transit stop from my home."	119	**0.76***	-24.5	0.12	0.076
	Comforts in walking[b]	"There are sidewalks on most of the streets." "The sidewalks are well maintained (e.g., paved, even, and not a lot of cracks)." "There are enough spaces (e.g., grass strip, trees) between the sidewalks and the vehicular roadways." "There are enough benches and other places to rest along the streets."	119	0.78	-22.4	0.13	0.140
	Crime Safety[b]	"There is a high crime rate in my neighborhood." (a reverse coding item) "The crime rate in my neighborhood makes it unsafe to go on walks during the day." (a reverse coding item) "The crime rate in my neighborhood makes it unsafe to go on walks at night." (a reverse coding item)	119	**1.93*****	92.8	0.47	0.007
	Place Dependence[b]	"My neighborhood is the best place for what I like to do." "No other place can compare to my neighborhood." "I get more satisfaction out of visiting my neighborhood than any other." "Doing what I do at my neighborhood is more important to me than doing it in any other place." "I wouldn't substitute any other area for doing the types of things I do at my neighborhood."	119	**1.65****	65.5	0.32	0.010
	Social Activity Places						
	Number of social activity places	"How many places do you visit for socialization at least once a week?" (ordinal)	119	1.05	4.6	0.16	0.769
	Frequency of social activity places	"How many times per week in total do you visit those places?" (ordinal)	119	1.18	17.8	0.21	0.358

Non-significant variables were excluded except for the several theoretically significant variables.
* p<.1, ** p<.05, *** p<.01
[a] Percent change in odds for unit increase in X
[b] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree

Table 26 (Continued)

Class	Predictor	Coding Scheme	CC membership: member= 1(binary) (outcome)				
			N	OR	%[a]	S.E.	P>|z|
Demographics	Sex	Female: 1(binary)	119	**3.69*** **	269.2	1.61	0.003
	Age	In years (continuous)	119	**1.10*** **	9.7	0.02	< 0.001
	Race	White: 1(binary)	119	**3.39** **	238.8	2.06	0.044
	Education	College graduate or more: 1(binary)	119	1.47	47.1	0.58	0.327
	Marital status	Currently married: 1(binary)	119	**4.16*** **	316.0	1.7	< 0.001
	Children in household	Children in household (<18yrs): 1(binary)	119	1.42	42.3	0.6	0.372
	Employment	Currently working: 1(binary)	119	0.93	-6.8	0.39	0.860
	Household income	Annual household income before tax (ordinal)	119	**1.58** **	58.3	0.28	0.010
	Home ownership	Home owner: 1(binary)	119	**4.49*** **	348.9	1.84	< 0.001
	Housing type	Single family housing: 1(binary)	119	**3.41*** **	241.4	1.44	0.004
	Commute mode	Commute by driving alone: 1(binary)	119	0.88	-12.5	0.35	0.741
	Car ownership	Car owner: 1(binary)	119	**3.45** **	245.0	1.75	0.014
	Number of cars	Number of cars in household, 5 or more = 5 (continuous)	119	1.29	29.0	0.27	0.221
	Length of residency	Years and months living in the community (continuous)	119	1.01	1.2	0.02	0.502
	City size	Metropolitan area (50,000 ≤ Pop.): 1(binary)	119	**0.12*** **	-87.7	0.06	< 0.001
	Population density	Population density per square mile of land area (continous)	119	1.00	-0.00	0.00	0.398
	Poverty rate by city	Poverty rate by city (continous)	119	1.03	2.6	0.02	0.183

Non-significant variables were excluded except for the several theoretically significant variables.
* p<.1, ** p<.05, *** p<.01

5.2.1.2. Multivariate Base Model

A base model was estimated for the multivariate analyses with only the significant personal and social demographic factors identified from the unadjusted analyses. The multivariate base model included sex, age, race, marital status, work status, household income, home ownership, housing type, car ownership, and city size. McFadden's Pseudo R^2 was used for the model fit test.[49] This multivariate base model was estimated to capture 44.15% (p <0.001) of the total variance (Table 27). In this model, those who were female, older, married, lived in the single family housing, and lived in smaller cities, were more likely to be CC members.

Table 27

(PH1-1) Base Model of CC Membership: Adjusted Logistic Regression

Class	Predictor	CC membership: member=1 (binary) (outcome)				
		OR	%	S.E.	B	P>|z|
Demographics	**Female: 1(binary)**	**8.93*** **	793.10	6.22	0.37	0.002
	Age	**1.08*** **	7.90	0.03	0.40	0.005
	White: 1(binary)	0.55	-44.70	0.53	-0.07	0.535
	Currently married: 1 (binary)	**2.81**	180.90	1.79	0.20	0.105
	Currently working: 1(binary)	0.92	-7.90	0.60	-0.02	0.899
	Household income	0.94	-5.50	0.28	-0.03	0.847
	Home owner: 1(binary)	0.92	-7.50	0.76	-0.02	0.924
	Single family housing: 1(binary)	**4.34**	334.20	3.91	0.25	0.103
	Car owner: 1(binary)	1.90	89.60	1.65	0.09	0.463
	Metropolitan area: 1(binary)	**0.06*** **	-94.00	0.04	-0.48	< 0.001
N				119		
LR chi2(10)				68.22		
Prob > chi2				< 0.001		
Pseudo R2				0.4415		

Non-significant variables were excluded except for the theoretically significant variable (working status).
* p<.1, ** p<.05, *** p<.01
% is percent change in odds for unit increase in X; McFadden's Pseudo R2 was used for the model fit test.

[49] STATA provides McFadden's Pseudo R^2 for the model fit test in the logistic regressions.

5.2.1.3. One-by-One Test

The following are the candidate variables identified from the study hypothesis: the main independent variables are neighborhood environmental ones about objectively and subjectively measured walkability, and social environments including safety from crime, place dependence, and the usage of social activity places. The initial candidate variables selected based on the study hypotheses were as follows: *destination accessibility, access to services, comforts in walking, crime safety, place dependence, number of social activity places,* and *frequency of social activity places*. Each independent variable was added to the multivariate base model one at a time to check its own contribution as a predictor of *CC membership*. After controlling for the 10 socio-demographic and household-related variables in the multivariate base model (Table 28), two neighborhood environment variables – *destination accessibility* and *place dependence* – were significant at the 0.1 level in the one-by-one tests (Table 28).

Table 28

(PH1-1) One-by-One Test of CC Membership: Adjusted Logistic Regression†

Class	Predictor	CC membership: member=1 (binary) (outcome)							
		OR	%	S.E.	β	P>|z|	*N*	P > chi2	Pseudo R2
Neighborhood Environment	**Objective Walkability**								
	Destination accessibility	**1.04****	4.0	0.02	0.30	0.023	113	< 0.001	0.50
	Perceived Walkability								
	Access to services[a]	0.91	-9.1	0.22	-0.05	0.700	119	< 0.001	0.44
	Comforts in walking[a]	1.09	9.1	0.31	0.04	0.762	119	< 0.001	0.44
	Crime Safety[a]	1.46	46.3	0.60	0.12	0.352	119	< 0.001	0.45
	Place Dependence[a]	**2.17****	116.9	0.73	0.28	0.021	119	< 0.001	0.48
	Social Activity Places								
	Number of social activity places	1.04	4.2	0.26	0.02	0.867	119	< 0.001	0.44
	Frequency of social activity places	0.99	-0.8	0.29	0.00	0.977	119	< 0.001	0.44

† All base model variables shown in Table 27 were controlled. Each neighborhood environment variable was tested one at a time with the base model.
[a] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree
* p<.1, ** p<.05, *** p<.01
β is fully standardized coefficient.
McFadden's Pseudo R2 was used for the model fit test.

5.2.1.4. Final Model

The final multivariate model showed an adequate fit ($p<0.001$) and explained 54.3% of the variance (Table 29). The final model included objective walkability and place dependence variables among seven neighborhood environmental variables, which were significant at the 0.1 level. Those who lived in higher objective *destination accessible* areas (Walk Score, from 0 through 100), compared to those who lived in less *destination accessibility* areas, increased the odds of being CC members by 4.7%, other things being equal. Also, those who reported greater *place dependence* (1 = strongly disagree through 5 = strongly agree), increased the odds of being CC members by 145.4%. From the demographic variables, CC members were more likely to be female, older, married, car owners, and live in single family housing and smaller cities (OR= 17.32, 1.09, 6.07, 11.88, 6.43, and 0.02, respectively).

Table 29

(PH1-1) Final Model of CC Membership: Adjusted Logistic Regression

Class	Predictor	CC membership: member=1 (binary) (outcome)				
		OR	%	S.E.	β	P>|z|
Neighborhood Environment	**Objective Walkability**					
	Destination accessibility[a]	**1.05****	4.7	0.02	0.30	0.017
	Place Dependence[b]	**2.45****	145.4	0.95	0.26	0.021
Demographics	Female: 1(binary)	**17.32*****	1632.4	16.21	0.34	0.002
	Age	**1.09*****	8.9	0.03	0.32	0.005
	White: 1(binary)	0.81	-18.5	0.98	-0.02	0.865
	Currently married: 1 (binary)	**6.07****	507.1	4.92	0.25	0.026
	Currently working: 1(binary)	0.46	-54.0	0.36	-0.10	0.327
	Household income	0.75	-24.5	0.29	-0.09	0.458
	Home owner: 1(binary)	1.47	46.7	1.41	0.05	0.690
	Single family housing: 1(binary)	**6.43***	542.5	7.03	0.23	0.089
	Car owner: 1(binary)	**11.88****	1087.7	14.54	0.25	0.043
	Metropolitan area: 1(binary)	**0.02*****	-97.8	0.02	-0.47	< 0.001
N				113		
LR chi2 (12)				80.98		
Prob > chi2				< 0.001		
Pseudo R2				0.5430		

Non-significant variables were excluded except for the theoretically significant variable (working status).
* p<.1, ** p<.05, *** p<.01
[a] Walk Score, from 0 through 100
[b] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree.
% is percent change in odds for unit increase in X.
β is fully standardized coefficient.
McFadden's Pseudo R2 was used for the model fit.

5.2.2. Primary Hypothesis 1-2: Correlate between Neighborhood Environments and CC Activities

5.2.2.1. Unadjusted Analyses

With the four CC activity items as outcome variables, each independent variable was tested for its bivariate correlation by the unadjusted logistic regression analyses. Each dependent variable (*participation in CC events, number of kinds of goods and services, average number of exchanges,* and *number of trading partners*) was a categorical variable and measured at the ordinal level. When the outcome is an ordinal variable, we can consider the ordinal logistic regression model that assumes (Cohen, Cohen, West, & Aiken, 2013): (1) the odds are equal across the continuum, given values of the predictors; and (2) errors are homoscedastic. However, these assumptions are often violated (R. Williams, 2008). Thus, in the current study, the binary logistic models were used to deal with these issues. Each dependent variable of CC activities was categorized as an active group (=1) vs. inactive group (= 0).[50] Independent variables included respondents' socio-demographic factors, socioeconomic status, and the environmental and social perception concerning neighborhoods.

Based on the levels of CC activities, each CC activity was placed into one of two groups: members actively participating in CC activities (the active members) or members inactively participating (the inactive members). Accordingly, each dependent

[50] The dependent variables were recoded as dichotomous based on the distribution (1= over the median value).

variable with over the median value coded as 1 was: (1) participating in CC events once a month or more =1; (2) exchanging three or more kinds of goods and services with CC per month =1; (3) exchanging three or more times per month=1; and (4) having three or more trading partners per month= 1.

From the results, perceived *access to services* was positively associated with *number of kinds of goods and services* and *number of trading partners*, at the 0.1 level (OR= 1.59 and 1.36, respectively) (Table 30). *Number of social activity places* and *frequency of social activity places* were positively related to all four CC activities except for *participation in CC events*, at the 0.1 level (Table 30). Nonsignificant variables were excluded from further analyses except for the theoretically important variable (work status) (Table 30).

Table 30

(PH1-2) Bivariate Correlates of CC Activities: Unadjusted Logistic Regression (Total *N*= 77)

Class	Predictor	Coding Scheme	Outcome 1: Participation in CC events (Once a month or more = 1)			Outcome 2: Number of kinds of goods and services (3+ /month = 1)		
			OR	P>|z|	*N*	OR	P>|z|	*N*
Neighborhood Environment	**Objective Walkability**							
	Destination accessibility	Walk Score, from 0 through 100, measured by Walkscore.com (continuous)	0.99	0.382	71	1.02	0.119	71
	Perceived Walkability							
	Access to services[a]	"Stores are within easy walking distance of my home." "There are many places to go within easy walking distance of my home." "It is easy to walk to a transit stop from my home."	0.82	0.216	77	**1.59****	0.010	77
	Comforts in walking[a]	"There are sidewalks on most of the streets." "The sidewalks are well maintained (e.g., paved, even, and not a lot of cracks)." "There are enough spaces (e.g., grass strip, trees) between the sidewalks and the vehicular roadways." "There are enough benches and other places to rest along the streets."	0.75	0.148	77	0.96	0.855	77
	Crime safety[ab]	"There is a high crime rate in my neighborhood." "The crime rate in my neighborhood makes it unsafe to go on walks during the day." "The crime rate in my neighborhood makes it unsafe to go on walks at night."	1.52	0.281	77	0.90	0.764	77
	Place Dependence[a]	"My neighborhood is the best place for what I like to do." "No other place can compare to my neighborhood." "I get more satisfaction out of visiting my neighborhood than any other." "Doing what I do at my neighborhood is more important to me than doing it in any other place." "I wouldn't substitute any other area for doing the types of things I do at my neighborhood."	1.20	0.398	77	1.38	0.151	77
	Social Activity Places							
	Number of social activity places	"How many places do you visit for socialization at least once a week?" (ordinal)	1.35	0.129	77	**1.74****	0.012	77
	Frequency of social activity places	"How many times per week in total do you visit those places?" (ordinal)	1.13	0.541	77	**1.63****	0.031	77

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree

[b] Reverse coding items

Table 30 (Continued)

Class	Predictor	Coding Scheme	Outcome 3: Average number of exchanges (3+ /month = 1)			Outcome 4: Number of trading partners (3+ /month = 1)		
			OR	P>|z|	*N*	OR	P>|z|	*N*
Neighborhood Environment	**Objective Walkability**							
	Destination accessibility	Walk Score, from 0 through 100, measured by Walkscore.com (continuous)	1.01	0.342	71	1.01	0.329	71
	Perceived Walkability							
	Access to services[a]	"Stores are within easy walking distance of my home." "There are many places to go within easy walking distance of my home." "It is easy to walk to a transit stop from my home."	1.24	0.210	77	**1.36***	0.088	77
	Comforts in walking[a]	"There are sidewalks on most of the streets." "The sidewalks are well maintained (e.g., paved, even, and not a lot of cracks)." "There are enough spaces (e.g., grass strip, trees) between the sidewalks and the vehicular roadways." "There are enough benches and other places to rest along the streets."	1.13	0.540	77	0.94	0.766	77
	Crime safety[ab]	"There is a high crime rate in my neighborhood." "The crime rate in my neighborhood makes it unsafe to go on walks during the day." "The crime rate in my neighborhood makes it unsafe to go on walks at night."	0.90	0.781	77	1.08	0.844	77
	Place Dependence[a]	"My neighborhood is the best place for what I like to do." "No other place can compare to my neighborhood." "I get more satisfaction out of visiting my neighborhood than any other." "Doing what I do at my neighborhood is more important to me than doing it in any other place." "I wouldn't substitute any other area for doing the types of things I do at my neighborhood."	1.32	0.216	77	1.16	0.511	77
	Social Activity Places							
	Number of social activity places	"How many places do you visit for socialization at least once a week?" (ordinal)	**1.95*****	0.004	77	**1.93*****	0.004	77
	Frequency of social activity places	"How many times per week in total do you visit those places?" (ordinal)	**1.75****	0.015	77	**1.60****	0.036	77

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree

[b] Reverse coding items

Table 30 (Continued)

Class	Predictor	Coding Scheme	Outcome 1			Outcome 2		
			Participation in CC events (Once a month or more = 1)			Number of kinds of goods and services (3+ /month = 1)		
			OR	P>|z|	*N*	OR	P>|z|	*N*
Demographics	Sex	Female: 1(binary)	0.52	0.291	77	2.40	0.180	77
	Age	In years (continuous)	1.01	0.740	77	0.99	0.582	77
	Race	White: 1(binary)	4.00	0.225	77	0.60	0.584	77
	Education	College graduate or more: 1(binary)	1.12	0.812	77	0.89	0.807	77
	Marital status	Currently married: 1(binary)	0.62	0.335	77	0.49	0.149	77
	Children in household	Children in household (<18yrs): 1(binary)	0.49	0.127	77	1.15	0.761	77
	Employment	Currently working: 1(binary)	1.62	0.328	77	0.62	0.335	77
	Household income	Annual household income before tax (ordinal)	0.94	0.724	77	0.91	0.591	77
	Home ownership	Home owner: 1(binary)	1.04	0.945	77	1.04	0.945	77
	Housing type	Single family housing: 1(binary)	2.13	0.210	77	0.77	0.649	77
	Commute mode	Commute by driving alone: 1(binary)	1.75	0.246	77	1.11	0.829	77
	Car ownership	Car owner: 1(binary)	3.09	0.185	77	0.27	0.126	77
	Number of cars	Number of cars in household, 5 or more = 5 (continuous)	1.47	0.149	77	0.99	0.969	77
	Length of residency	Years and months living in the community (continuous)	1.03	0.231	77	0.98	0.479	77
	City size	Metropolitan area (50,000 ≤ Pop.): 1(binary)	1.09	0.895	77	1.09	0.895	77
	Population density	Population density per square mile of land area (continuous)	1.00	0.304	77	1.00	0.126	77
	Poverty rate by city	Poverty rate by city (continuous)	0.98	0.463	77	1.03	0.265	77

* p<.1, ** p<.05, *** p<.01

Table 30 (Continued)

Class	Predictor	Coding Scheme	Outcome 3			Outcome 4		
			Average number of exchanges (3+ /month = 1)			Number of trading partners (3+ /month = 1)		
			OR	P>|z|	*N*	OR	P>|z|	*N*
Demographics	Sex	Female: 1(binary)	1.75	0.390	77	1.44	0.575	77
	Age	In years (continuous)	1.00	0.910	77	0.99	0.486	77
	Race	White: 1(binary)	0.16	0.108	77	0.38	0.302	77
	Education	College graduate or more: 1(binary)	0.95	0.924	77	0.46	0.114	77
	Marital status	Currently married: 1(binary)	**0.32****	0.025	77	**0.41***	0.075	77
	Children in household	Children in household (<18yrs): 1(binary)	1.21	0.685	77	1.64	0.300	77
	Employment	Currently working: 1(binary)	0.86	0.763	77	0.67	0.427	77
	Household income	Annual household income before tax (ordinal)	0.92	0.671	77	0.80	0.249	77
	Home ownership	Home owner: 1(binary)	1.30	0.631	77	0.78	0.646	77
	Housing type	Single family housing: 1(binary)	2.26	0.200	77	1.86	0.332	77
	Commute mode	Commute by driving alone: 1(binary)	**3.12****	0.029	77	1.88	0.216	77
	Car ownership	Car owner: 1(binary)	0.39	0.217	77	0.57	0.451	77
	Number of cars	Number of cars in household, 5 or more = 5 (continuous)	0.90	0.669	77	0.70	0.201	77
	Length of residency	Years and months living in the community (continuous)	1.01	0.552	77	1.00	0.997	77
	City size	Metropolitan area (50,000 ≤ Pop.): 1(binary)	0.56	0.431	77	0.68	0.594	77
	Population density	Population density per square mile of land area (continuous)	**1.00***	0.085	77	**1.00****	0.046	77
	Poverty rate by city	Poverty rate by city (continuous)	**1.05***	0.054	77	1.04	0.123	77

* p<.1, ** p<.05, *** p<.01

5.2.2.2. Multivariate Base Model

From the unadjusted analyses, if a confounding variable was significantly correlated with at least one dependent variable, the confounding variable was retained in the base model. Four significant confounding variables among 17 demographic variables were selected for constructing the base model, including marital status, commute mode, work status, and the poverty rate by city[51](Table 31). The model fits of this multivariate base model were satisfactory in *average number of exchanges* and *number of trading partners* (p= 0.0005 and 0.030, respectively), capturing 19% and 11% of the total variance, respectively (Table 31).

[51] Due to the multicollinearity issue, *population density* was dropped in the base model. Work status was included based on the extant literature.

Table 31

(PH1-2) Base Model of CC Activities: Adjusted Logistic Regression

Class	Predictor	Outcome 1			Outcome 2			Outcome 3			Outcome 4		
		Participation in CC events (Once a month or more = 1)			Number of kinds of goods and services (3+ /month = 1)			Average number of exchanges (3+ /month = 1)			Number of trading partners (3+ /month = 1)		
		OR	β	P>|z|	OR	β	P>|z|	OR	β	P>|z|	OR	β	P>|z|
Demographics	Currently married: 1(binary)	0.59	-0.23	0.293	0.48	-0.31	0.146	**0.23****	-0.42	0.011	**0.36***	-0.36	0.055
	Commute by driving alone: 1(binary)	1.55	0.20	0.399	1.58	0.20	0.396	**8.36*****	0.62	0.003	**3.58****	0.46	0.043
	Currently working: 1(binary)	1.39	0.14	0.536	0.53	-0.27	0.235	0.40	-0.26	0.151	0.42	-0.31	0.140
	Poverty rate by city	0.99	-0.14	0.527	1.03	0.25	0.251	**1.07****	0.45	0.014	**1.05***	0.38	0.071
N		77			77			77			77		
LR chi2(4)		3.21			4.92			20.17			10.74		
Prob > chi2		0.523			0.295			**0.0005**			**0.030**		
Pseudo R2		0.0301			0.05			0.19			0.11		

Non-significant variables were excluded except for the theoretically significant variable (working status).
* p<.1, ** p<.05, *** p<.01
β is fully standardized coefficient.
McFadden's Pseudo R2 was used for the model fit.

5.2.2.3. One-by-One Test

After estimating the multivariate base model consisting of demographic variables, each independent variable – the environmental variable – was tested with the multivariate base model one at a time in the four sets of CC activity models to check its own contribution as a predictor of *CC activities*: *participation in CC events, number of kinds of goods and services, average number of exchanges,* and *number of trading partners.* If the independent variable was significantly correlated with at least one dependent variable, the independent variable was maintained in the final model. Thus, perceived walkability (*access to services* and *comforts in walking*) and social activity places (*number* and *frequency of social activity places*) were included in the final model, which were significant at the 0.1 level (Table 32).

Table 32

(PH1-2) One-by-One Test of CC Activities: Adjusted Logistic Regression†

Class	Predictor	Outcome 1					Outcome 2				
		Participation in CC events (Once a month or more = 1)					Number of kinds of goods and services (3+ /month = 1)				
		OR	P>|z|	N	P>chi2	Pseudo R2	OR	P>|z|	N	P>chi2	Pseudo R2
Neighborhood Environment	**Objective Walkability**										
	Destination accessibility	0.99	0.345	71	0.564	0.04	1.013	0.233	71	0.329	0.06
	Perceived Walkability										
	Access to services[a]	0.80	0.224	77	0.451	0.04	**1.54****	0.029	77	0.072	0.09
	Comforts in walking[a]	**0.69**	0.101	77	0.303	0.06	0.87	0.518	77	0.375	0.05
	Crime safety[a]	1.69	0.206	77	0.424	0.05	1.05	0.908	77	0.424	0.05
	Place Dependence[a]	1.19	0.466	77	0.586	0.04	1.33	0.256	77	0.284	0.06
	Social Activity Places										
	Number of social activity places	**1.46***	0.080	77	0.264	0.06	**1.59****	0.046	77	0.096	0.09
	Frequency of social activity places	1.12	0.589	77	0.623	0.03	**1.52***	0.076	77	0.140	0.08

† All base model variables shown in Table 31 were controlled. Each neighborhood environment variable was tested one at a time with the base model.
* p<.1, ** p<.05, *** p<.01
[a] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree
McFadden's Pseudo R2 was used for the model fit test.

Table 32 (Continued)

Class	Predictor	Outcome 3					Outcome 4				
		Average number of exchanges (3+ /month = 1)					Number of trading partners (3+ /month = 1)				
		OR	P>|z|	N	P>chi2	Pseudo R2	OR	P>|z|	N	P>chi2	Pseudo R2
Neighborhood Environment	**Objective Walkability**										
	Destination accessibility	1.01	0.668	71	0.001	0.21	1.00	0.691	71	0.100	0.10
	Perceived Walkability										
	Access to services[a]	1.01	0.954	77	0.001	0.19	1.21	0.349	77	0.040	0.11
	Comforts in walking[a]	0.85	0.521	77	0.001	0.20	0.73	0.218	77	0.031	0.12
	Crime safety[a]	1.19	0.674	77	0.001	0.19	1.39	0.434	77	0.044	0.11
	Place Dependence[a]	0.95	0.840	77	0.001	0.19	0.92	0.765	77	0.055	0.11
	Social Activity Places										
	Number of social activity places	**1.67***	0.052	77	< 0.001	0.23	**1.69****	0.034	77.00	0.007	0.16
	Frequency of social activity places	**1.61***	0.074	77	< 0.001	0.23	1.45	0.125	77	0.022	0.13

† All base model variables shown in Table 31 were controlled. Each neighborhood environment variable was tested one at a time with the base model.
* p<.1, ** p<.05, *** p<.01
[a] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree
McFadden's Pseudo R2 was used for the model fit test.

5.2.2.4. Final Model

Four final models – *participation in CC events, number of kinds of goods and services, average number of exchanges,* and *number of trading partners* – were fitted, adding four subjectively measured environmental variables to the base model. These variables, which were significantly related to dependent variables in the one-by-one tests, included *access to services, comforts in walking, number of social activity places* and *frequency of social activity places.* All final models presented adequate fits except for the *participation in CC events* model at the 0.1 level (Table 33). 15.7% of the total variance was explained by the final model of *number of kinds of goods and services.* 23.95% of the total variance was captured by the final model of *average number of exchanges.* Also, 18.15% of the total variance was accounted for by the final model of *number of trading partners.*

Perceived *access* to services was the determinant of the increasing effect on the probability of *number of kinds of goods and services* by 87.3%. In the other two models, *average number of exchanges* and *number of trading partners,* the four neighborhood environment variables had no significant impact. From the demographic factors, those who were married had decreased odds of doing exchanges by 72.5%, when compared to those who were unmarried. When respondents commuted by driving alone, the probability of *average number of exchanges* and *number of trading partners* increased by 652.5% and 229.2%, respectively. Moreover, for those who lived in higher poverty rate areas, there was a significantly positive relationship with *average number of exchanges.*

Table 33

(PH1-2) Final Model of CC Activities: Adjusted Logistic Regression

Class	Predictor	Outcome 1					Outcome 2				
		Participation in CC events (Once a month or more = 1)					Number of kinds of goods and services (3+ /month = 1)				
		OR	%	S.E.	β	P>|z|	OR	%	S.E.	β	P>|z|
Neighborhood Environment	**Perceived Walkability**										
	Access to services[a]	0.85	-15.2	0.19	-0.18	0.456	**1.87****	87.3	0.49	0.59	0.018
	Comforts in walking[a]	0.76	-24	0.20	-0.25	0.295	0.62	-38.2	0.19	-0.38	0.117
	Social Activity Places										
	Number of social activity places	**1.75***	74.6	0.52	0.53	0.059	1.38	38.1	0.41	0.27	0.278
	Frequency of social activity places	0.77	-22.8	0.23	-0.23	0.385	1.08	7.8	0.34	0.06	0.809
Demographics	Currently married: 1(binary)	0.56	-44.5	0.30	-0.22	0.276	0.58	-42.4	0.32	-0.17	0.327
	Commute by driving alone: 1(binary)	1.40	39.6	0.77	0.13	0.547	1.45	45.2	0.85	0.12	0.523
	Currently working: 1(binary)	2.20	120.5	1.32	0.29	0.186	0.70	-29.5	0.43	-0.11	0.569
	Poverty rate by city	0.99	-1.0	0.03	-0.08	0.698	1.00	0.3	0.03	0.02	0.922
N				77					77		
LR chi2(8)				10.38					16.74		
Prob > chi2				0.2391					**0.033**		
Pseudo R2				0.0974					0.1570		

Non-significant variables were excluded except for the theoretically significant variable.
* p<.1, ** p<.05, *** p<.01
[a] Measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree
% is percent change in odds for unit increase in X
β is fully standardized coefficient.
McFadden's Pseudo R2 was used for the model fit.

Table 33 (Continued)

Class	Predictor	Outcome 3					Outcome 4				
		Average number of exchanges (3+ /month = 1)					Number of trading partners (3+ /month = 1)				
		OR	%	S.E.	B	P>|z|	OR	%	S.E.	β	P>|z|
Neighborhood Environment	**Perceived Walkability**										
	Access to services[a]	1.00	0.2	0.23	0.002	0.993	1.37	37.2	0.33	0.29	0.191
	Comforts in walking[a]	0.96	-3.5	0.29	-0.02	0.906	0.66	-33.9	0.20	-0.31	0.173
	Social Activity Places										
	Number of social activity places	1.45	44.9	0.47	0.25	0.248	1.61	60.8	0.49	0.37	0.120
	Frequency of social activity places	1.26	26.2	0.44	0.15	0.499	0.97	-2.5	0.31	-0.02	0.937
Demographics	Currently married: 1(binary)	**0.28****	-72.5	0.17	-0.34	0.037	0.41	-58.6	0.24	-0.27	0.126
	Commute by driving alone: 1(binary)	**7.53*****	652.5	5.58	0.54	0.006	**3.29***	229.2	2.18	0.37	0.071
	Currently working: 1(binary)	0.51	-48.6	0.36	-0.17	0.340	0.64	-35.6	0.42	-0.13	0.499
	Poverty rate by city	**1.06***	6.0	0.04	0.34	0.088	1.04	3.8	0.03	0.25	0.258
N				77					77		
LR chi2(8)				25.03					18.51		
Prob > chi2				**0.0015**					**0.0177**		
Pseudo R2				0.2395					0.1815		

Non-significant variables were excluded except for the theoretically significant variable.
* p<.1, ** p<.05, *** p<.01
[a] Measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree
% is percent change in odds for unit increase in X
β is fully standardized coefficient.
McFadden's Pseudo R2 was used for the model fit.

5.2.3. Primary Hypothesis 2: Correlate between CC Activities and Community Attachment

The final multivariate regression model of *neighborhood cohesion* showed non-normal distribution of residuals, even though all three dependent variables were normally distributed. Thus, the regression with robust standard errors was employed to predict three community attachment factors – *neighborhood cohesion*, *community support*, and *local shopping loyalty* — with CC activities.

5.2.3.1. Unadjusted Analyses

For the unadjusted analyses on community attachment factors, CC activities, CC satisfaction, and demographic characteristics were examined and identified from extant studies and study hypotheses (Table 34). In terms of CC activities, *time credits (TC) to use for obtaining services not available on the market* was positively associated with *neighborhood cohesion* and *local shopping loyalty* at the 0.1 level. Also, *TC to receive for providing services* and *TC to receive for offering services not available on the market* were important factors in *neighborhood cohesion* at the 0.1 level. In terms of CC satisfaction, *social satisfaction with CC* had a significantly positive impact on all three dependent variables (*neighborhood cohesion*, *community support*, and *local shopping loyalty*) at the 0.1 or better level (Table 34). *Economic satisfaction with CC* was an important factor in *neighborhood cohesion* and *community support* at the 0.1 or better level (Table 34).

Table 34

(PH2) Bivariate Correlates of Community Attachment among CC Users: Unadjusted Regression with Robust Standard Errors (Total *N*= 77)

Class		Coding Scheme	Outcome 1				Outcome 2			
			Neighborhood Cohesion[a]				Community Support[a]			
			N	b	Robust S.E.	P>|t|	*N*	b	Robust S.E.	P>|t|
CC Activities and Satisfaction	Participation in CC events	Once a month or more : 1(binary)	77	0.21	0.19	0.260	77	0.22	0.18	0.229
	Number of kinds of goods and services	3 or more/month : 1(binary)	77	0.19	0.19	0.304	77	0.25	0.18	0.165
	Average number of exchanges	3 or more /month : 1(binary)	77	0.19	0.19	0.331	77	0.25	0.18	0.175
	Number of trading partners	3 or more /month : 1(binary)	77	0.18	0.19	0.346	77	0.26	0.19	0.172
	Account balance	Balanced(-20 ~ +20): 1(binary)	77	-0.08	0.19	0.658	77	0.08	0.18	0.681
	Time credits (TC) to use for obtaining services	"During the past year, how many time credits did you use to obtain services in the TimeBank?" (continuous)	75	0.002	0.003	0.593	75	-0.002	0.002	0.403
	TC to use for obtaining services available on the market	"During the past year, how many time credits did you use to obtain services that you would normally pay U.S. currency to receive?" (continuous)	75	0.0003	0.004	0.922	75	-0.003	0.003	0.284
	TC to use for obtaining services not available on the market	"During the past year, how many time credits did you use to obtain services that would NOT be available for any amount of U.S. currency?" (continuous)	73	**0.019***	0.011	0.081	73	0.012	0.009	0.163
	Time credits (TC) to receive for providing services	"During the past year, how many time credits were recorded to your account for services you provided?" (continuous)	73	**0.001****	0.0003	0.035	73	-0.0003	0.0003	0.230
	TC to receive for offering services available on the market	"During the past year, how many time credits did you receive for services you also offer, or previously offered, on the market economy?" (continuous)	74	0.006	0.004	0.115	74	0.004	0.004	0.289
	TC to receive for offering services not available on the market	"During the past year, how many time credits did you receive for services you have NEVER been paid in U.S. currency for?" (continuous)	73	**0.001****	0.0003	0.019	73	-0.0003	0.0002	0.232

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 4-point scale from 1 = not at all to 4 = completely

[b] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree

Table 34 (Continued)

Class		Coding Scheme	Outcome 3			
			Local Shopping Loyalty[a]			
			N	b	Robust S.E.	P>|t|
CC Activities and Satisfaction	Participation in CC events	Once a month or more : 1(binary)	77	0.12	0.10	0.237
	Number of kinds of goods and services	3 or more/month : 1(binary)	77	0.07	0.10	0.495
	Average number of exchanges	3 or more /month : 1(binary)	77	0.01	0.10	0.902
	Number of trading partners	3 or more /month : 1(binary)	77	0.02	0.11	0.823
	Account balance	Balanced(-20 ~ +20): 1(binary)	77	0.05	0.11	0.628
	Time credits (TC) to use for obtaining services	"During the past year, how many time credits did you use to obtain services in the TimeBank?" (continuous)	75	-0.001	0.002	0.588
	TC to use for obtaining services available on the market	"During the past year, how many time credits did you use to obtain services that you would normally pay U.S. currency to receive?" (continuous)	75	-0.002	0.002	0.366
	TC to use for obtaining services not available on the market	"During the past year, how many time credits did you use to obtain services that would NOT be available for any amount of U.S. currency?" (continuous)	73	**0.008***	0.004	0.076
	Time credits (TC) to receive for providing services	"During the past year, how many time credits were recorded to your account for services you provided?" (continuous)	73	0.0001	0.0002	0.762
	TC to receive for offering services available on the market	"During the past year, how many time credits did you receive for services you also offer, or previously offered, on the market economy?" (continuous)	74	0.002	0.003	0.478
	TC to receive for offering services not available on the market	"During the past year, how many time credits did you receive for services you have NEVER been paid in U.S. currency for?" (continuous)	73	0.0001	0.0002	0.367

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 4-point scale from 1 = not at all to 4 = completely

[b] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree

Table 34 (Continued)

Class		Coding Scheme	Outcome 1				Outcome 2			
			Neighborhood Cohesion[a]				Community Support[a]			
			N	b	Robust S.E.	P>|t|	*N*	B	Robust S.E.	P>|t|
CC Activities and Satisfaction	Time credits (TC) to receive for giving goods	"During the past year, if you gave away goods for time credits, how many time credits did you receive for these goods?" (continuous)	63	-0.005	0.004	0.183	63	0.006	0.005	0.262
	Time credits (TC) to use for obtaining goods	"During the past year, if you acquired goods for time credits, how many time credits did you use for these goods?" (continuous)	64	0.003	0.007	0.727	64	-0.01	0.01	0.252
	Social satisfaction with CC[b]	"Community Currency has helped me increase my circle of friends." "Community Currency has helped me develop my self-confidence." "Community Currency has given me the ability to help people." "Community Currency has helped me establish relationships of trust for ongoing or future exchanges of items, goods, and services." "I consciously try to go to the stores or practitioners who accept Community Currency." "After participating in the Community Currency program, I am more willing to stay in the current community than before." "After participating in the Community Currency program, I am more satisfied with my life than before."	77	**0.32*** **	0.12	0.009	77	**0.22***	0.11	0.054
	Economic satisfaction with CC[b]	"Community Currency has helped me to use skills I would not have otherwise used." "Community Currency has given me access to goods and/or services that I would not have otherwise been able to acquire." "Community Currency has given me trading partners for giving my goods and/or services that I otherwise would not have had." "Community Currency has helped me dispose of unneeded or unused items."	77	**0.21** **	0.10	0.047	77	**0.19***	0.10	0.055
	Length of CC membership	Years and months participating in CC prgrams (continuous)	77	0.00	0.08	0.996	77	0.02	0.07	0.786

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 4-point scale from 1 = not at all to 4 = completely

[b] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree

Table 34 (Continued)

Class		Coding Scheme	Outcome 3			
			Local Shopping Loyalty[a]			
			N	b	Robust S.E.	P>|t|
CC Activities and Satisfaction	Time credits (TC) to receive for giving goods	"During the past year, if you gave away goods for time credits, how many time credits did you receive for these goods?" (continuous)	63	-0.001	0.002	0.528
	Time credits (TC) to use for obtaining goods	"During the past year, if you acquired goods for time credits, how many time credits did you use for these goods?" (continuous)	64	-0.01	0.004	0.223
	Social satisfaction with CC[b]	"Community Currency has helped me increase my circle of friends." "Community Currency has helped me develop my self-confidence." "Community Currency has given me the ability to help people." "Community Currency has helped me establish relationships of trust for ongoing or future exchanges of items, goods, and services." "I consciously try to go to the stores or practitioners who accept Community Currency." "After participating in the Community Currency program, I am more willing to stay in the current community than before."""" "After participating in the Community Currency program, I am more satisfied with my life than before."	77	**0.15*****	0.06	0.009
	Economic satisfaction with CC[b]	"Community Currency has helped me to use skills I would not have otherwise used." "Community Currency has given me access to goods and/or services that I would not have otherwise been able to acquire." "Community Currency has given me trading partners for giving my goods and/or services that I otherwise would not have had." "Community Currency has helped me dispose of unneeded or unused items."	77	0.08	0.05	0.148
	Length of CC membership	Years and months participating in CC prgrams (continuous)	77	-0.02	0.04	0.691

* p<.1, ** p<.05, *** p<.01
[a] Composite score, measured along a 4-point scale from 1 = not at all to 4 = completely
[b] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree

Table 34 (Continued)

Class		Coding Scheme	Outcome 1				Outcome 2			
			Neighborhood Cohesion[a]				Community Support[a]			
			N	b	Robust S.E.	P>|t|	*N*	b	Robust S.E.	P>|t|
Demographics	Sex	Female: 1(binary)	77	0.25	0.28	0.361	77	0.38	0.26	0.146
	Age	In years (continuous)	77	**-0.01***	0.01	0.053	77	-0.002	0.01	0.814
	Race	White: 1(binary)	77	-0.25	0.33	0.450	77	-0.23	0.26	0.375
	Education	College graduate or more: 1(binary)	77	**-0.40****	0.19	0.035	77	-0.21	0.19	0.262
	Marital status	Currently married: 1(binary)	77	-0.11	0.18	0.548	77	-0.18	0.19	0.356
	Children in household	Children in household (<18yrs): 1(binary)	77	0.17	0.19	0.356	77	-0.05	0.18	0.770
	Employment	Currently working: 1(binary)	77	0.20	0.20	0.317	77	0.12	0.20	0.535
	Household income	Annual household income before tax (ordinal)	77	**0.12***	0.07	0.072	77	0.08	0.07	0.252
	Home ownership	Home owner: 1(binary)	77	-0.11	0.19	0.571	77	0.01	0.20	0.965
	Housing type	Single family housing: 1(binary)	77	0.13	0.18	0.471	77	0.24	0.18	0.196
	Commute mode	Commute by driving alone: 1(binary)	77	**0.43****	0.18	0.017	77	0.12	0.18	0.496
	Car ownership	Car owner: 1(binary)	77	**0.41****	0.19	0.035	77	**0.37***	0.19	0.058
	Number of cars	Number of cars in household, 5 or more = 5 (continuous)	77	0.12	0.10	0.214	77	0.05	0.11	0.622
	Length of residency	Years and months living in the community (continuous)	77	0.01	0.01	0.551	77	0.01	0.01	0.126
	City size	Metropolitan area (50,000 ≤ Pop.): 1(binary)	77	0.21	0.28	0.457	77	0.07	0.27	0.788
	Population density	Population density per square mile of land area (continuous)	77	**0.0003****	0.0002	0.095	77	0.0001	0.0002	0.679
	Poverty rate by city	Poverty rate by city (continuous)	77	**0.02****	0.01	0.013	77	0.01	0.01	0.242

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 4-point scale from 1 = not at all to 4 = completely

Table 34 (Continued)

Class		Coding Scheme	Outcome 3			
			Local Shopping Loyalty[a]			
			N	b	Robust S.E.	P>|t|
Demographics	Sex	Female: 1(binary)	77	0.18	0.12	0.141
	Age	In years (continuous)	77	-0.004	0.004	0.359
	Race	White: 1(binary)	77	**0.17***	0.09	0.068
	Education	College graduate or more: 1(binary)	77	**-0.19***	0.10	0.055
	Marital status	Currently married: 1(binary)	77	0.03	0.11	0.754
	Children in household	Children in household (<18yrs): 1(binary)	77	0.04	0.10	0.708
	Employment	Currently working: 1(binary)	77	0.02	0.10	0.836
	Household income	Annual household income before tax (ordinal)	77	0.03	0.04	0.364
	Home ownership	Home owner: 1(binary)	77	0.06	0.11	0.568
	Housing type	Single family housing: 1(binary)	77	-0.02	0.12	0.885
	Commute mode	Commute by driving alone: 1(binary)	77	**0.18***	0.10	0.06
	Car ownership	Car owner: 1(binary)	77	**0.19***	0.11	0.073
	Number of cars	Number of cars in household, 5 or more = 5 (continuous)	77	**0.12****	0.05	0.023
	Length of residency	Years and months living in the community (continuous)	77	0.01	0.01	0.313
	City size	Metropolitan area (50,000 ≤ Pop.): 1(binary)	77	0.13	0.16	0.419
	Population density	Population density per square mile of land area (continuous)	77	0.0001	0.0001	0.526
	Poverty rate by city	Poverty rate by city (continuous)	77	0.005	0.005	0.306

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 4-point scale from 1 = not at all to 4 = completely

5.2.3.2. Multivariate Base Model

From the bivariate analysis results by unadjusted regressions with robust standard errors, nine statistically significant demographic variables and one theoretically significant variable — *length of residency* — were used while building the base model.

The initial multivariate base model was estimated with the 10 demographic variables based on the results from the unadjusted analyses (Table 35). However, only five statistically significant variables at the 0.1 level from the initial base model (*age, race, education level, length of residency,* and *population density*) and two theoretically important variables (*presence of children in household* and *home ownership*) were maintained in the final base model (Table 36).

Two final base models of *neighborhood cohesion* and *local shopping loyalty* indicated acceptable fits at the 0.1 level, capturing 17% and 13% of the total variance, respectively (Table 36).

Table 35

(PH2) Initial Base Model of Community Attachment among CC users: Adjusted Regression with Robust Standard Errors

Class	Predictor	Outcome 1			Outcome 2			Outcome 3		
		Neighborhood Cohesion[a]			Community Support[a]			Local Shopping Loyalty[a]		
		b	β	P>|t|	b	β	P>|t|	b	β	P>|t|
Demographics	Age	**-0.02***	-0.25	0.081	-0.01	-0.12	0.385	**-0.009***	-0.25	0.062
	White: 1(binary)	-0.19	-0.06	0.568	-0.37	-0.12	0.149	**0.21****	0.12	0.049
	College graduate or more: 1(binary)	-0.32	-0.19	0.136	-0.29	-0.17	0.195	**-0.20***	-0.21	0.093
	Household income	0.13	0.19	0.106	0.10	0.15	0.278	0.00	0.01	0.946
	Commute by driving alone: 1(binary)	0.31	0.18	0.132	-0.06	-0.04	0.793	0.14	0.15	0.262
	Car owner: 1(binary)	0.30	0.11	0.312	0.41	0.16	0.122	0.15	0.10	0.362
	Children in household (<18yrs): 1(binary)	-0.18	-0.11	0.387	-0.21	-0.13	0.338	-0.15	-0.17	0.163
	Home owner: 1(binary)	-0.23	-0.12	0.354	-0.15	-0.08	0.538	0.09	0.08	0.529
	Length of residency	0.01	0.17	0.163	**0.02****	0.26	0.048	0.01	0.17	0.253
	Population density	**0.0003***	0.25	0.050	0.00	0.05	0.738	0.00	0.10	0.412
N			77			77			77	
F(10, 66)			2.72			1.30			2.23	
Prob > F			**0.01**			0.25			**0.03**	
R-squared			0.28			0.13			0.16	

Non-significant variables were excluded except for the several theoretically significant variables.
* p<.1, ** p<.05, *** p<.01
[a] Composite score, measured along a 4-point scale from 1 = not at all to 4 = completely

Table 36

(PH2) Final Base Model of Community Attachment among CC users: Adjusted Regression with Robust Standard Errors

Class	Predictor	Outcome 1			Outcome 2			Outcome 3		
		Neighborhood Cohesion[a]			Community Support[a]			Local Shopping Loyalty[a]		
		b	β	P>|t|	b	β	P>|t|	b	β	P>|t|
Demographics	Age	**-0.02***	-0.25	0.073	-0.01	-0.11	0.467	**-0.01***	-0.23	0.085
	White: 1(binary)	-0.13	-0.04	0.669	-0.27	-0.08	0.283	**0.19****	0.11	0.043
	College graduate or more: 1(binary)	**-0.40***	-0.23	0.054	-0.29	-0.18	0.154	**-0.24****	-0.25	0.030
	Children in household (<18yrs): 1(binary)	-0.07	-0.05	0.713	-0.18	-0.11	0.406	-0.10	-0.11	0.358
	Home owner: 1(binary)	0.02	0.01	0.917	0.04	0.02	0.871	0.12	0.12	0.332
	Length of residency	0.01	0.18	0.132	**0.02***	0.24	0.068	0.01	0.19	0.180
	Population density	**0.0002***	0.21	0.086	0.00005	0.04	0.767	0.00004	0.06	0.597
N			77			77			77	
F(7, 69)			2.200			1.06			2.52	
Prob > F			**0.04**			0.40			**0.02**	
R-squared			0.17			0.09			0.13	

Non-significant variables were excluded except for the several theoretically significant variables.
* p<.1, ** p<.05, *** p<.01
[a] Composite score, measured along a 4-point scale from 1 = not at all to 4 = completely

5.2.3.3. Final Model

From the results of one-by-one tests (Table 37), three final models were constructed. The final models included *time credits (TC) to use for obtaining services, time credits (TC) to receive for providing services, social satisfaction with CC*, and *economic satisfaction with CC* (Table 38). The final models with the outcome variables of *neighborhood cohesion, community support*, and *local shopping loyalty* indicated satisfactory fits at the 0.1 or better level. The final models explained 29.73%, 19.14%, and 26.45% of the total variance of each outcome variable, respectively (Table 38).

The final model (Table 38) indicated that *time credits (TC) to use for obtaining services* was a significant and negative predictor on *community support* and *local shopping loyalty* at the 0.1 or better level. However, *time credits (TC) to receive for providing services* was a significant and positive factor on *neighborhood cohesion* and *local shopping loyalty* (Table 38). While *social satisfaction with CC* was positively correlated with *neighborhood cohesion* and *local shopping loyalty*, *economic satisfaction with CC* was insignificant in all three models. In terms of demographics, the younger people were more likely to report a higher level of *neighborhood cohesion. White* was a positive predictor of *local shopping loyalty* at the 0.1 level. Also, those who were less educated were positively associated with *local shopping loyalty*. Those who lived longer in the community were more likely to have significantly higher levels of all three community attachment factors. Moreover, those who lived in more densely populated areas were more likely to show a marginally significantly higher level of *neighborhood cohesion.*

Table 37

(PH2) One-by-One Test of Community Attachment among CC users: Adjusted Regression with Robust Standard Errors†

Class		Outcome 1					Outcome 2				
		Neighborhood Cohesion[a]					Community Support[a]				
		b	P>|t|	*N*	P>F	R2	B	P>|t|	*N*	P>F	R2
CC Activities and Satisfaction	Participation in CC events[b]	0.25	0.172	77	0.037	0.20	0.19	0.329	77	0.379	0.10
	Number of kinds of goods and services[c]	0.12	0.490	77	0.082	0.18	0.26	0.152	77	0.343	0.11
	Average number of exchanges[c]	0.10	0.629	77	0.073	0.18	0.20	0.281	77	0.454	0.10
	Number of trading partners[c]	-0.003	0.988	77	0.073	0.17	0.19	0.334	77	0.456	0.10
	Account balance[d]	-0.08	0.71	77	0.07	0.17	0.16	0.440	77	0.369	0.09
	Time credits (TC) to use for obtaining services	0.001	0.819	75	0.087	0.17	0.00	0.146	75	0.220	0.11
	TC for obtaining services available on the market	-0.001	0.865	75	0.086	0.17	**-0.01***	0.062	75	0.166	0.12
	TC for obtaining services not available on the market	**0.02***	0.081	73	0.037	0.20	0.01	0.165	73	0.404	0.10
	Time credits (TC) to receive for providing services	**0.001****	0.040	73	0.028	0.18	0.00	0.323	73	0.482	0.07
	TC for offering services available on the market	0.004	0.400	74	0.097	0.18	0.00	0.571	74	0.566	0.08
	TC for offering services not available on the market	**0.001****	0.015	73	0.006	0.20	0.00	0.284	73	0.406	0.08
	Time credits (TC) to receive for giving goods	-0.006	0.214	63	0.132	0.19	0.01	0.243	63	0.204	0.14
	Time credits (TC) to use for obtaining goods	-0.001	0.949	64	0.087	0.20	-0.01	0.125	64	0.278	0.15
	Social satisfaction with CC[e]	**0.33*****	0.008	77	0.004	0.27	**0.20**	0.104	77	0.196	0.12
	Economic satisfaction with CC[e]	**0.22****	0.047	77	0.017	0.22	**0.23****	0.042	77	0.103	0.14
	Length of CC membership	-0.01	0.942	76	0.073	0.17	0.01	0.885	76	0.492	0.09

† All base model variables shown in Table 36 were controlled. Each independent variable was tested one at a time with the base model.
* p<.1, ** p<.05, *** p<.01
[a] Composite score, measured along a 4-point scale from 1 = not at all to 4 = completely
[b] Once a month or more : 1(binary)
[c] 3+ /month : 1(binary)
[d] Balanced (-20 ~ +20): 1(binary) ; [e] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree

Table 37 (Continued)

Class		Outcome 3				
		Local Shopping Loyalty[a]				
		B	P>|t|	*N*	P>F	R2
CC Activities and Satisfaction	Participation in CC events[b]	0.09	0.409	77	0.039	0.14
	Number of kinds of goods and services[c]	0.06	0.540	77	0.058	0.13
	Average number of exchanges[c]	0.01	0.954	77	0.039	0.13
	Number of trading partners[c]	-0.02	0.846	77	0.039	0.13
	Account balance[d]	0.09	0.430	77	0.023	0.13
	Time credits (TC) to use for obtaining services	0.00	0.427	75	0.007	0.15
	TC for obtaining services available on the market	0.00	0.210	75	0.003	0.17
	TC for obtaining services not available on the market	**0.01****	0.046	73	0.017	0.16
	Time credits (TC) to receive for providing services	0.00	0.790	73	0.018	0.14
	TC for offering services available on the market	0.00	0.620	74	0.027	0.13
	TC for offering services not available on the market	0.00	0.392	73	0.013	0.13
	Time credits (TC) to receive for giving goods	0.00	0.659	63	0.034	0.13
	Time credits (TC) to use for obtaining goods	-0.01	0.260	64	0.015	0.16
	Social satisfaction with CC[e]	**0.15****	0.025	77	0.007	0.19
	Economic satisfaction with CC[e]	**0.11***	0.074	77	0.018	0.16
	Length of CC membership	-0.02	0.728	76	0.033	0.13

† All base model variables shown in Table 36 were controlled. Each independent variable was tested one at a time with the base model.
* p<.1, ** p<.05, *** p<.01
[a] Composite score, measured along a 4-point scale from 1 = not at all to 4 = completely
[b] Once a month or more : 1(binary)
[c] 3+ /month : 1(binary)
[d] Balanced (-20 ~ +20): 1(binary) ; [e] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree

Table 38

(PH2) Final Model of Community Attachment among CC Users: Adjusted Regression with Robust Standard Errors†

Class	Predictor	Outcome 1			Outcome 2			Outcome 3		
		Neighborhood Cohesion[a]			Community Support[a]			Local Shopping Loyalty[a]		
		b	β	P>|t|	b	β	P>|t|	b	β	P>|t|
CC Activities and Satisfaction	Time credits (TC) to use for obtaining services	-0.01	-0.24	0.189	**-0.01***	-0.36	0.071	**-0.01****	-0.48	0.049
	Time credits (TC) to receive for providing services	**0.001****	0.26	0.026	0.001	0.14	0.264	**0.001****	0.32	0.039
	Social satisfaction with CC[c]	**0.37****	0.37	0.039	0.07	0.08	0.696	**0.16***	0.29	0.07
	Economic satisfaction with CC[c]	-0.04	-0.04	0.804	0.22	0.25	0.189	0.02	0.03	0.834
Demographics	Age	**-0.02***	-0.23	0.09	-0.004	-0.07	0.607	-0.01	-0.18	0.141
	White: 1(binary)	-0.08	-0.02	0.784	-0.08	-0.02	0.772	**0.24****	0.13	0.049
	College graduate or more: 1(binary)	-0.32	-0.18	0.12	-0.29	-0.18	0.136	**-0.19***	-0.20	0.074
	Children in household (<18yrs): 1(binary)	0.21	0.13	0.309	-0.07	-0.05	0.751	0.05	0.06	0.656
	Home owner: 1(binary)	-0.14	-0.07	0.56	-0.14	-0.08	0.55	0.01	0.01	0.907
	Length of residency	**0.02***	0.24	0.059	**0.03*****	0.38	0.004	**0.02****	0.34	0.011
	Population density	**0.0002**	0.18	0.109	2.13E-05	0.02	0.882	3.97E-05	0.06	0.588
N			77			77			77	
F(11, 61)			3.52			1.81			3.82	
Prob > F			**0.0007**			**0.0710**			**0.0003**	
R-squared			0.2973			0.1914			0.2645	

Non-significant variables were excluded except for the several theoretically significant variables.
* p<.1, ** p<.05, *** p<.01
[a] Composite score, measured along a 4-point scale from 1 = not at all to 4 = completely
[b] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree

5.2.4. Primary Hypothesis 3: Correlate between CC Activities and Quality of Life

There was no unified correcting functional form for the normality of five dependent variables: *physical and material well-being*, *relations with other people*, *social/community/ civic activities*, *personal development and fulfillment*, and *recreation*. Thus, to manage this normality issue, the regression with robust standard errors was employed for investigating primary hypothesis 3.

5.2.4.1. Unadjusted Analyses

Results from the unadjusted analyses revealed that *TC to receive for providing services* and *TC to receive for offering services not available on the market* had significantly positive associations with all five QOL factors. *Social satisfaction with CC* was a significant and positive factor on *physical and material well-being*, *social/community/civic activities*, and *personal development and fulfillment* at the 0.1 level (Table 39). *Length of CC membership* had a significantly positive correlation with *physical and material well-being* at the 0.1 level. From the unadjusted analyses, 11 statistically significant demographic variables were used when constructing the base model.

Table 39

(PH3) Bivariate Correlates of Quality of Life among CC Users: Unadjusted Regression with Robust Standard Errors (Total *N*= 77)

Class	Predictors	Coding Scheme	Outcome 1				Outcome 2			
			Physical and Material Well-Being[a]				Relations with Other People[a]			
			N	b	Robust S.E.	P>|t|	*N*	b	Robust S.E.	P>|t|
CC Activities and Satisfaction	Participation in CC events	Once a month or more : 1(binary)	77	0.26	0.23	0.265	77	0.38	0.22	0.088
	Number of kinds of goods and services	3 or more/month : 1(binary)	77	-0.16	0.23	0.499	77	-0.16	0.22	0.488
	Average number of exchanges	3 or more /month : 1(binary)	77	0.26	0.24	0.276	77	0.16	0.22	0.472
	Number of trading partners	3 or more /month : 1(binary)	77	-0.01	0.24	0.955	77	0.10	0.23	0.654
	Account balance	-20 ~ +20: 1(binary)	77	-0.18	0.23	0.443	77	0.01	0.24	0.970
	Time credits (TC) to use for obtaining services	"During the past year, how many time credits did you use to obtain services in the TimeBank?" (continuous)	75	0.003	0.003	0.410	75	-0.001	0.003	0.828
	TC to use for obtaining services available on the market	"During the past year, how many time credits did you use to obtain services that you would normally pay U.S. currency to receive?" (continuous)	75	0.003	0.004	0.411	75	-0.001	0.003	0.800
	TC to use for obtaining services not available on the market	"During the past year, how many time credits did you use to obtain services that would NOT be available for any amount of U.S. currency?" (continuous)	73	0.02	0.01	0.248	73	0.01	0.01	0.275
	Time credits (TC) to receive for providing services	"During the past year, how many time credits were recorded to your account for services you provided?" (continuous)	73	**0.001*** **	0.0002	< 0.001	73	0.0004	0.0002	0.056
	TC to receive for offering services available on the market	"During the past year, how many time credits did you receive for services you also offer, or previously offered, on the market economy?" (continuous)	74	0.001	0.01	0.923	74	-0.01	0.01	0.192
	TC to receive for offering services not available on the market	"During the past year, how many time credits did you receive for services you have NEVER been paid in U.S. currency for?" (continuous)	73	**0.001*** **	0.0002	< 0.001	73	**0.0006*** **	0.0002	< 0.001

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 7-point scale from 1 = terrible to 7 = delighted

[b] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree

Table 39 (Continued)

Class	Predictors	Outcome 3				Outcome 4				Outcome 5			
		Social, Community, and Civic Activities[a]				Personal Development and Fulfillment[a]				Recreation[a]			
		N	B	Robust S.E.	P>|t|	*N*	b	Robust S.E.	P>|t|	*N*	b	Robust S.E.	P>|t|
CC Activities and Satisfaction	Participation in CC events	77	0.34	0.21	0.111	77	0.44	0.21	0.037	77	0.27	0.22	0.219
	Number of kinds of goods and services	77	0.04	0.21	0.852	77	-0.005	0.22	0.982	77	-0.07	0.22	0.756
	Average number of exchanges	77	0.30	0.21	0.163	77	-0.01	0.23	0.950	77	0.13	0.23	0.580
	Number of trading partners	77	0.17	0.22	0.429	77	-0.19	0.24	0.425	77	-0.01	0.24	0.956
	Account balance	77	-0.11	0.22	0.599	77	0.02	0.23	0.913	77	0.19	0.24	0.431
	Time credits (TC) to use for obtaining services	75	0.001	0.003	0.747	75	0.0003	0.003	0.930	75	-0.001	0.004	0.860
	TC for obtaining services available on the market	75	0.001	0.004	0.804	75	0.001	0.004	0.849	75	-0.002	0.01	0.735
	TC for obtaining services not available on the market	73	0.02	0.01	0.142	73	0.005	0.01	0.741	73	0.02	0.01	0.160
	Time credits (TC) to receive for providing services	73	**0.001*** **	0.0002	< 0.001	73	**0.0005***	0.0003	0.078	73	**0.001****	0.0003	0.048
	TC for offering services available on the market	74	0.001	0.005	0.922	74	-0.002	0.01	0.758	74	-0.01	0.01	0.429
	TC for offering services not available on the market	73	**0.001*** **	0.0001	< 0.001	73	**0.0005*** **	0.0002	0.009	73	**0.0008*** **	0.0002	< 0.001

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 7-point scale from 1 = terrible to 7 = delighted

[b] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree

Table 39 (Continued)

Class	Predictors	Coding Scheme	Outcome 1				Outcome 2			
			Physical and Material Well-Being[a]				Relations with Other People[a]			
			N	b	Robust S.E.	P>|t|	*N*	b	Robust S.E.	P>|t|
CC Activities and Satisfaction	Time credits (TC) to receive for giving goods	"During the past year, if you gave away goods for time credits, how many time credits did you receive for these goods?" (continuous)	63	0.005	0.01	0.584	63	-0.001	0.01	0.902
	Time credits (TC) to use for obtaining goods	"During the past year, if you acquired goods for time credits, how many time credits did you use for these goods?" (continuous)	64	-0.01	0.01	0.508	64	-0.01	0.01	0.278
	Social satisfaction with CC[b]	"Community Currency has helped me increase my circle of friends." "Community Currency has helped me develop my self-confidence." "Community Currency has given me the ability to help people." "Community Currency has helped me establish relationships of trust for ongoing or future exchanges of items, goods, and services." "I consciously try to go to the stores or practitioners who accept Community Currency." "After participating in the Community Currency program, I am more willing to stay in the current community than before." "After participating in the Community Currency program, I am more satisfied with my life than before."	77	**0.27****	0.13	0.043	77	0.20	0.15	0.190
	Economic satisfaction with CC[b]	"Community Currency has helped me to use skills I would not have otherwise used." "Community Currency has given me access to goods and/or services that I would not have otherwise been able to acquire." "Community Currency has given me trading partners for giving my goods and/or services that I otherwise would not have had." "Community Currency has helped me dispose of unneeded or unused items."	77	0.19	0.14	0.187	77	0.03	0.14	0.800
	Length of CC membership	Years and months participating in CC programs (continuous)	76	**0.15***	0.08	0.063	76	0.10	0.07	0.139

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 7-point scale from 1 = terrible to 7 = delighted

[b] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree

Table 39 (Continued)

Class	Predictors	Outcome 3				Outcome 4				Outcome 5			
		Social, Community, and Civic Activities[a]				Personal Development and Fulfillment[a]				Recreation[a]			
		N	b	Robust S.E.	P>|t|	*N*	b	Robust S.E.	P>|t|	*N*	b	Robust S.E.	P>|t|
CC Activities and Satisfaction	Time credits (TC) to receive for giving goods	63	0.004	0.007	0.568	63	-0.01	0.01	0.465	63	-0.001	0.01	0.913
	Time credits (TC) to use for obtaining goods	64	-0.003	0.01	0.842	64	-0.01	0.01	0.475	64	-0.02	0.02	0.408
	Social satisfaction with CC[b]	77	**0.36****	0.17	0.035	77	**0.25****	0.12	0.044	77	0.21	0.16	0.194
	Economic satisfaction with CC[b]	77	0.14	0.14	0.319	77	0.10	0.11	0.353	77	0.02	0.12	0.885
	Length of CC membership	76	-0.01	0.08	0.904	76	0.05	0.07	0.541	76	0.01	0.08	0.923

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 7-point scale from 1 = terrible to 7 = delighted

[b] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree

Table 39 (Continued)

Class	Predictors	Coding Scheme	Outcome 1				Outcome 2			
			Physical and Material Well-Being[a]				Relations with Other People[a]			
			N	B	Robust S.E.	P>|t|	*N*	b	Robust S.E.	P>|t|
Demographics	Sex	Female: 1(binary)	77	0.29	0.26	0.264	77	-0.30	0.25	0.234
	Age	In years (continuous)	77	0.01	0.01	0.242	77	-0.001	0.01	0.956
	Race	White: 1(binary)	77	-0.13	0.32	0.679	77	-0.05	0.30	0.861
	Education	College graduate or more: 1(binary)	77	0.25	0.23	0.278	77	-0.08	0.25	0.756
	Marital status	Currently married: 1(binary)	77	**0.44***	0.23	0.067	77	**0.47***	0.27	0.081
	Children in household	Children in household (<18yrs): 1(binary)	77	-0.03	0.23	0.890	77	0.11	0.22	0.627
	Employment	Currently working: 1(binary)	77	**0.52****	0.26	0.049	77	0.21	0.25	0.406
	Household income	Annual household income before tax (ordinal)	77	**0.33*****	0.08	< 0.001	77	**0.18***	0.10	0.077
	Home ownership	Home owner: 1(binary)	77	**0.70*****	0.25	0.006	77	0.33	0.31	0.285
	Housing type	Single family housing: 1(binary)	77	**0.75*****	0.27	0.006	77	0.35	0.33	0.286
	Commute mode	Commute by driving alone: 1(binary)	77	0.38	0.24	0.112	77	**0.42***	0.25	0.092
	Car ownership	Car owner: 1(binary)	77	**1.09*****	0.37	0.004	77	**1.08****	0.47	0.023
	Number of cars	Number of cars in household, 5 or more = 5 (continuous)	77	**0.42*****	0.11	< 0.001	77	**0.29****	0.13	0.032
	Length of residency	Years and months living in the community (continuous)	77	**0.02***	0.01	0.085	77	-0.001	0.01	0.916
	City size	Metropolitan area (50,000 ≤ Pop.): 1(binary)	77	0.14	0.32	0.652	77	0.18	0.24	0.455
	Population density	Population density per square mile of land area (continuous)	77	0.00003	0.00	0.883	77	-0.0001	0.0001	0.641
	Poverty rate by city	Poverty rate by city (continuous)	77	0.01	0.01	0.450	77	-0.002	0.01	0.832

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 7-point scale from 1 = terrible to 7 = delighted

Table 39 (Continued)

Class	Predictors	Outcome 3				Outcome 4				Outcome 5			
		Social, Community, and Civic Activities[a]				Personal Development and Fulfillment[a]				Recreation[a]			
		N	b	Robust S.E.	P>|t|	*N*	B	Robust S.E.	P>|t|	*N*	b	Robust S.E.	P>|t|
Demographics	Sex	77	-0.26	0.23	0.262	77	-0.13	0.24	0.577	77	0.26	0.28	0.348
	Age	77	0.01	0.01	0.453	77	**0.02***	0.01	0.060	77	-0.0002	0.01	0.973
	Race	77	0.07	0.36	0.850	77	-0.14	0.28	0.602	77	-0.56	0.36	0.120
	Education	77	-0.23	0.21	0.291	77	0.03	0.23	0.914	77	0.08	0.23	0.722
	Marital status	77	-0.14	0.24	0.548	77	0.04	0.23	0.852	77	0.22	0.27	0.426
	Children in household	77	-0.04	0.21	0.867	77	-0.18	0.21	0.406	77	-0.23	0.23	0.308
	Employment	77	-0.10	0.24	0.672	77	0.29	0.25	0.244	77	0.39	0.26	0.138
	Household income	77	0.09	0.09	0.337	77	0.15	0.09	0.105	77	**0.17**	0.10	0.100
	Home ownership	77	-0.000000001	0.24	1.000	77	0.05	0.25	0.844	77	0.02	0.25	0.932
	Housing type	77	**0.37***	0.20	0.075	77	**0.45***	0.26	0.084	77	0.32	0.28	0.251
	Commute mode	77	0.12	0.21	0.579	77	**0.44***	0.22	0.052	77	0.17	0.21	0.439
	Car ownership	77	**0.50***	0.26	0.058	77	**1.29*****	0.39	0.001	77	**0.65***	0.34	0.055
	Number of cars	77	**0.20***	0.11	0.069	77	**0.33*****	0.10	0.002	77	**0.27****	0.11	0.019
	Length of residency	77	0.01	0.01	0.450	77	0.01	0.01	0.252	77	0.00	0.01	0.809
	City size	77	0.44	0.28	0.120	77	0.22	0.34	0.508	77	**0.48***	0.27	0.078
	Population density	77	0.00001	0.0002	0.943	77	-0.0002	0.0001	0.257	77	-0.00004	0.0001	0.761
	Poverty rate by city	77	0.01	0.01	0.471	77	-0.003	0.01	0.711	77	0.01	0.01	0.468

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 7-point scale from 1 = terrible to 7 = delighted

5.2.4.2. Multivariate Base Model

With 11 statistically significant demographic variables at the level of 0.1 or better, the initial multivariate base model was estimated (Table 40). Then, only seven statistically significant variables were selected for building the final base model, including age, marital status, home ownership, car ownership, number of cars in the household, and city size. All of the models, except for the model of *relations with other people*, displayed acceptable fits at the level of 0.1 or better (Table 41). These models of *physical and material well-being, social/community/civic activities, personal development and fulfillment,* and *recreation* explained 23.13%, 14.16%, 30.04%, and 14.39% of the total variance, respectively.

Table 40

(PH3) Initial Base Model of Quality of Life among CC Users: Adjusted Regression with Robust Standard Errors

Class	Predictor	Outcome 1: Physical and Material Well-Being[a]			Outcome 2: Relations with Other People[a]			Outcome 3: Social, Community, and Civic activities[a]			Outcome 4: Personal Development and Fulfillment[a]			Outcome 5: Recreation[a]		
		b	β	P>|t|	b	β	P>|t|	b	β	P>|t|	b	β	P>|t|	b	β	P>|t|
Demographics	Age	0.01	0.09	0.493	0.00	-0.06	0.707	0.01	0.08	0.524	**0.02***	0.21	0.075	0.01	0.09	0.440
	Currently married: 1(binary)	0.09	0.04	0.747	0.16	0.08	0.572	**-0.47***	-0.24	0.081	-0.22	-0.11	0.382	-0.01	0.00	0.974
	Currently working: 1(binary)	0.28	0.13	0.297	-0.03	-0.01	0.911	-0.21	-0.11	0.472	0.17	0.08	0.431	0.40	0.19	0.246
	Household income	**0.20***	0.24	0.051	0.05	0.07	0.661	0.05	0.07	0.658	0.04	0.05	0.728	0.09	0.11	0.481
	Home owner: 1(binary)	-0.16	-0.07	0.683	0.05	0.02	0.910	-0.58	-0.27	0.153	**-0.88*****	-0.41	0.006	**-0.75***	-0.34	0.062
	Single family housing: 1(binary)	0.19	0.07	0.587	-0.12	-0.05	0.731	0.43	0.19	0.236	0.33	0.14	0.158	0.28	0.12	0.410
	Commute by driving alone: 1(binary)	-0.01	-0.01	0.959	0.15	0.07	0.586	-0.13	-0.07	0.577	-0.04	-0.02	0.853	-0.22	-0.11	0.419
	Car owner: 1(binary)	0.29	0.09	0.575	0.82	0.26	0.179	0.27	0.09	0.518	**0.85****	0.28	0.038	0.24	0.08	0.598
	Number of cars in household	0.15	0.14	0.254	0.09	0.09	0.574	**0.31****	0.31	0.023	**0.33****	0.32	0.012	**0.27***	0.26	0.077
	Length of residency	0.02	0.15	0.187	0.00	-0.04	0.775	0.01	0.10	0.439	0.01	0.11	0.336	0.001	0.01	0.923
	Metropolitan area (50,000 ≤ Pop.): 1(binary)	0.15	0.05	0.636	-0.07	-0.02	0.807	**0.63***	0.23	0.064	0.40	0.14	0.318	**0.56***	0.20	0.098
N			77			77			77			77			77	
F(11, 65)			2.69			0.89			2.19			4.09			1.83	
Prob > F			**0.0065**			0.5525			**0.0256**			**0.0001**			**0.0672**	
R-squared			0.265			0.1548			0.186			0.3253			0.1805	

Non-significant variables were excluded.

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 7-point scale from 1 = terrible to 7 = delighted

Table 41

(PH3) Final Base Model of Quality of Life among CC Users: Adjusted Regression with Robust Standard Errors

Class	Predictor	Outcome 1			Outcome 2			Outcome 3			Outcome 4			Outcome 5		
		Physical and Material Well-Being[a]			Relations with Other People[a]			Social, Community, and Civic activities[a]			Personal Development and Fulfillment[a]			Recreation[a]		
		b	β	P>|t|	b	β	P>|t|	B	β	P>|t|	B	β	P>|t|	b	β	P>|t|
Demographics	Age	0.01	0.08	0.526	-0.01	-0.07	0.627	0.01	0.12	0.314	**0.02***	0.20	0.066	0.005	0.06	0.538
	Currently married: 1(binary)	-0.06	-0.03	0.817	0.16	0.08	0.534	**-0.44***	-0.22	0.073	-0.30	-0.15	0.174	-0.08	-0.04	0.765
	Household income	**0.21****	0.26	0.028	0.04	0.06	0.721	0.07	0.09	0.569	0.06	0.08	0.577	0.13	0.16	0.308
	Home owner: 1(binary)	0.13	0.05	0.714	-0.03	-0.01	0.930	-0.39	-0.18	0.203	**-0.62****	-0.29	0.035	-0.53	-0.24	0.141
	Car owner: 1(binary)	0.45	0.14	0.299	0.88	0.28	0.114	0.23	0.08	0.476	**0.98****	0.32	0.010	0.26	0.08	0.552
	Number of cars in household	0.17	0.16	0.190	0.10	0.10	0.520	**0.29****	0.29	0.033	**0.34*****	0.33	0.007	**0.27***	0.25	0.068
	Metropolitan area (50,000 ≤ Pop.): 1(binary)	0.06	0.02	0.861	-0.04	-0.01	0.882	0.59	0.22	0.096	0.33	0.12	0.404	0.51	0.18	0.124
N		77			77			77			77			77		
F(7, 69)		2.97			1.21			2.23			4.49			2.05		
Prob > F		**0.0089**			0.3067			**0.0415**			**0.0004**			**0.0613**		
R-squared		0.2313			0.1494			0.1416			0.3004			0.1439		

Non-significant variables were excluded.
* p<.1, ** p<.05, *** p<.01
[a] Composite score, measured along a 7-point scale from 1 = terrible to 7 = delighted

5.2.4.3. Final Model

Based on the results from the one-by-one tests (Table 42), *time credits (TC) to use for obtaining services, time credits (TC) to receive for providing services, satisfaction with CC,* and *length of CC membership* were included in the final model. All five sets of the final models – *physical and material well-being, relations with other people, social/community/civic activities, personal development and fulfillment,* and *recreation* – displayed satisfactory fits at the level of 0.05 or better (Table 43). The five final models accounted for 31.88%, 21.67%, 26.53%, 37.02% and 20.69% of the total variance, respectively.

Respondents who showed higher levels of *social satisfaction with CC* were more likely to be satisfied with *physical and material well-being, social/community/civic activities* and *personal development and fulfillment.* Those with longer *CC membership* were more likely to be satisfied with *physical and material well-being* and *relations with other people.* In terms of the demographic variables, the older people were more likely to be satisfied with *personal development and fulfillment.* Unmarried people were significantly and positively related to *social/community/civic activities* and *personal development and fulfillment.* Respondents with higher incomes were more likely to be satisfied with *physical and material well-being.* Those who did not have houses were more likely to be satisfied with *personal development and fulfillment* and *recreation.* Car owners as well as those with more cars in the household were more likely to be satisfied with *personal development and fulfillment.* Lastly, those who lived in metropolitan areas reported relatively high ratings of *recreation.*

Table 42

(PH3) One-by-One Test of Quality of Life among CC Users: Adjusted Regression with Robust Standard Errors†

Class	Predictors	Outcome 1: Physical and Material Well-Being[a]					Outcome 2: Relations with Other People[a]					Outcome 3: Social, Community, and Civic activities[a]				
		b	P>|t|	*N*	P>F	R2	B	P>|t|	*N*	P>F	R2	b	P>|t|	*N*	P>F	R2
CC Activities and Satisfaction	Participation in CC events[b]	0.19	0.406	77	0.013	0.24	0.32	0.137	77	0.317	0.17	0.20	0.368	77	0.063	0.15
	Number of kinds of goods and services[c]	-0.08	0.720	77	0.010	0.23	-0.04	0.864	77	0.412	0.15	0.02	0.918	77	0.058	0.14
	Average number of exchanges[c]	0.36	0.110	77	0.011	0.26	0.33	0.130	77	0.165	0.17	0.34	0.117	77	0.065	0.17
	Number of trading partners[c]	0.15	0.522	77	0.022	0.24	0.23	0.298	77	0.366	0.16	0.24	0.251	77	0.081	0.16
	Account balance[d]	-0.15	0.21	77	0.017	0.24	-0.13	0.583	77	0.364	0.15	-0.07	0.780	77	0.069	0.14
	Time credits (TC) to use for obtaining services	0.002	0.518	75	0.015	0.24	0.00002	0.994	75	0.205	0.16	0.0002	0.958	75	0.051	0.16
	TC to use for obtaining services available on the market	0.002	0.508	75	0.013	0.24	-0.0002	0.949	75	0.197	0.16	-0.0002	0.965	75	0.051	0.16
	TC to use for obtaining services not available on the market	0.013	0.129	73	0.021	0.23	0.014	0.174	73	0.164	0.19	**0.02***	0.050	73	0.009	0.18
	Time credits (TC) to receive for providing services	**0.001***	0.074	73	< 0.001	0.26	0.0002	0.555	73	0.009	0.18	0.0004	0.204	73	< 0.001	0.18
	TC to receive for offering services available on the market	0.004	0.372	74	0.005	0.25	-0.005	0.403	74	0.155	0.18	0.0009	0.860	74	0.047	0.17
	TC to receive for offering services not available on the market	**0.0006***	0.051	73	< 0.001	0.25	0.0003	0.375	73	0.016	0.18	0.0004	0.131	73	< 0.001	0.22
	Time credits (TC) to receive for giving goods	0.009	0.181	63	0.002	0.33	0.002	0.753	63	0.567	0.14	0.009	0.115	63	0.001	0.24
	Time credits (TC) to use for obtaining goods	-0.007	0.509	64	0.002	0.31	-0.01	0.314	64	0.357	0.16	-0.002	0.868	64	0.010	0.19
	Social satisfaction with CC[e]	0.23	0.118	77	0.013	0.26	0.22	0.190	77	0.129	0.18	**0.36****	0.034	77	0.001	0.24
	Economic satisfaction with CC[e]	0.16	0.333	77	0.022	0.25	0.04	0.788	77	0.351	0.15	0.17	0.167	77	0.018	0.17
	Length of CC membership	**0.15***	0.08	76	0.062	0.05	0.10	0.140	76	0.060	0.05	-0.01	0.90	76	0.904	0.0002

† All base model variables shown in Table 41 were controlled. Each independent variable was tested one at a time with the base model.
* p<.1, ** p<.05, *** p<.01
[a] Composite score, measured along a 7-point scale from 1 = terrible to 7 = delighted
[b] Once a month or more : 1(binary)
[c] 3+ /month : 1(binary)
[d] Balanced (-20 ~ +20): 1(binary)
[e] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree

Table 42 (Continued)

Class	Predictors	Outcome 4					Outcome 5				
		Personal Development and Fulfillment[a]					Recreation[a]				
		b	P>|t|	*N*	P>F	R2	b	P>|t|	*N*	P>F	R2
CC Activities and Satisfaction	Participation in CC events[b]	0.23	0.253	77	< 0.001	0.31	0.19	0.379	77	0.096	0.15
	Number of kinds of goods and services[c]	0.10	0.598	77	0.001	0.30	-0.03	0.897	77	0.093	0.14
	Average number of exchanges[c]	0.09	0.667	77	0.001	0.30	0.26	0.249	77	0.078	0.16
	Number of trading partners[c]	-0.07	0.745	77	< 0.001	0.30	0.12	0.624	77	0.135	0.15
	Account balance[d]	0.05	0.841	77	0.0004	0.30	0.15	0.519	77	0.058	0.15
	Time credits (TC) to use for obtaining services	-0.0002	0.932	75	0.0011	0.3106	-0.0009	0.806	75	0.134	0.14
	TC to use for obtaining services available on the market	-0.0004	0.876	75	0.0011	0.3107	-0.002	0.672	75	0.133	0.14
	TC to use for obtaining services not available on the market	0.006	0.449	73	0.0077	0.2876	**0.02***	0.065	73	0.065	0.15
	Time credits (TC) to receive for providing services	-7.40e-06	0.978	73	0.0001	0.3354	0.0001	0.742	73	0.001	0.16
	TC to receive for offering services available on the market	-0.0001	0.979	74	0.0011	0.3105	-0.003	0.655	74	0.107	0.16
	TC to receive for offering services not available on the market	-0.0001	0.724	73	< 0.001	0.4108	0.0002	0.564	73	< 0.001	0.19
	Time credits (TC) to receive for giving goods	-0.002	0.666	63	< 0.001	0.5012	0.005	0.539	63	0.003	0.21
	Time credits (TC) to use for obtaining goods	-0.005	0.507	64	< 0.001	0.4376	-0.013	0.360	64	0.025	0.21
	Social satisfaction with CC[d]	**0.22****	0.032	77	< 0.001	0.33	0.21	0.226	77	0.026	0.17
	Economic satisfaction with CC[d]	0.17	0.149	77	0.001	0.33	0.04	0.748	77	0.069	0.15
	Length of CC membership	0.05	0.539	76	0.539	0.005	0.008	0.922	76	0.922	0.0002

† All base model variables shown in Table 41 were controlled. Each independent variable was tested one at a time with the base model.
* p<.1, ** p<.05, *** p<.01
[a] Composite score, measured along a 7-point scale from 1 = terrible to 7 = delighted
[b] Once a month or more : 1(binary)
[c] 3+ /month : 1(binary)
[d] Balanced (-20 ~ +20): 1(binary)
[e] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree

Table 43

(PH3) Final Model of Quality of Life among CC Users: Adjusted Regression with Robust Standard Errors

Class	Predictors	Outcome 1 Physical and Material Well-Being[a]			Outcome 2 Relations with Other People[a]			Outcome 3 Social, Community, and Civic activities[a]			Outcome 4 Personal Development and Fulfillment[a]			Outcome 5 Recreation[a]		
		b	β	P>|t|	b	β	P>|t|	B	β	P>|t|	b	β	P>|t|	b	β	P>|t|
CC Activities and Satisfaction	Time credits (TC) to use for obtaining services	-0.004	-0.15	0.337	-0.005	-0.18	0.212	-0.01	-0.23	0.212	-0.004	-0.15	0.366	-0.01	-0.22	0.352
	Time credits (TC) to receive for providing services	0.0004	0.05	0.614	0.0004	0.06	0.526	0.001	0.16	0.215	< 0.001	-0.01	0.963	0.001	0.09	0.565
	Social satisfaction with CC[b]	**0.25***	0.21	0.096	0.25	0.21	0.149	**0.39****	0.35	0.026	**0.25****	0.22	0.015	0.24	0.21	0.172
	Length of CC membership	**0.20****	0.29	0.021	**0.15***	0.23	0.078	0.09	0.15	0.281	0.15	0.24	0.03	0.13	0.20	0.14
Demographics	Age	0.01	0.08	0.489	-0.01	-0.06	0.68	0.01	0.11	0.3	**0.02****	0.21	0.039	0.01	0.07	0.53
	Currently married: 1(binary)	-0.15	-0.07	0.542	0.07	0.03	0.776	**-0.48****	-0.24	0.042	**-0.38***	-0.19	0.057	-0.17	-0.08	0.479
	Household income	**0.25****	0.31	0.014	0.08	0.11	0.516	0.09	0.12	0.394	0.10	0.14	0.358	0.16	0.21	0.193
	Home owner: 1(binary)	-0.06	-0.02	0.872	-0.16	-0.07	0.689	-0.42	-0.20	0.168	**-0.76*****	-0.35	0.009	**-0.62***	-0.28	0.072
	Car owner: 1(binary)	0.42	0.13	0.322	0.86	0.27	0.136	0.32	0.11	0.353	**0.93****	0.31	0.01	0.24	0.08	0.595
	Number of cars in household	0.14	0.13	0.26	0.07	0.06	0.688	0.18	0.17	0.172	**0.32****	0.31	0.014	0.23	0.21	0.142
	Metropolitan area (50,000 ≤ Pop.): 1(binary)	0.45	0.15	0.227	0.26	0.09	0.366	0.83	0.31	0.017	0.64	0.23	0.125	**0.77****	0.27	0.03
N			77			77			77			77			77	
F(11, 65)			8.20			3.55			5.21			4.78			3.58	
Prob > F			**< 0.001**			**0.0006**			**< 0.001**			**< 0.001**			**0.0006**	
R-squared			0.3188			0.2167			0.2653			0.3702			0.2069	

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 7-point scale from 1 = terrible to 7 = delighted

[b] Once a month or more : 1(binary)

[c] 3+ /month : 1(binary)

[d] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree

5.2.5. Secondary Hypothesis 1: Correlate between Neighborhood Environments and Community Attachment

5.2.5.1. Unadjusted Analyses

For the unadjusted analyses on community attachment factors (*neighborhood cohesion, community support*[52], and *local shopping loyalty*), neighborhood environmental factors, and demographics were examined and identified from existing evidence and study hypotheses (Table 44).

From the bivariate analysis results by unadjusted regressions with robust standard errors, 11 demographic variables were chosen for the multivariate base model construction, including nine statistically significant demographic variables and two theoretically significant variables of *children in household* and *length of residency*.

[52] For *community support*, there was no correcting functional form for normal distribution, although multiple regression models generally necessitate the normal distribution of dependent variables. The residuals from regressions with non-normally distributed variables can generate the non-normal distribution of residuals around each predicted dependent variable score, even though the residuals' normality is one of the important assumptions of ordinary least squares (OLS) regression. Moreover, an incorrect functional form can create statistically undesirable test scores assuming there is normal distribution (e.g., Z-tests, t-tests, F-tests, chi-square tests, etc.). Thus, to deal with these concerns about normality and heteroscedasticity, a robust regression estimate was employed. This robust regression yields the same coefficients and R2 as those of the OLS regression. Regressions with the robust standard errors do not require normality assumption (Acock, 2008). STATA provides robust standard errors measured using a Huber-White sandwich estimator. The robust standard errors can be used even when the OLS assumptions are met. The t-values are slightly smaller in most cases (Acock, 2008).

Table 44

(SH1) Bivariate Correlates of Community Attachment: Unadjusted Regression with Robust Standard Errors (Total *N*= 119)

Class	Predictor	Coding Scheme	Outcome 1 Neighborhood Cohesion[a]				Outcome 2 Community Support[a]				Outcome 3 Local Shopping Loyalty[a]			
			b	Robust S.E.	P>|t|	*N*	b	Robust S.E.	P>|t|	*N*	b	Robust S.E.	P>|t|	*N*
CC membership		CC member= 1(binary)	**0.30***	0.16	0.057	119	**0.62*****	0.14	< 0.001	119	**0.45*****	0.12	< 0.001	119
Neighborhood Environment	**Objective Walkability**													
	Destination accessibility	Street Smart Walk Score (SSWS), from 0 through 100, measured by Walkscore.com (continous)	0.0002	0.003	0.96	113	-0.004	0.003	0.292	113	-0.002	0.002	0.485	113
	Perceived Walkability													
	Access to services[b]	"Stores are within easy walking distance of my home." "There are many places to go within easy walking distance of my home." "It is easy to walk to a transit stop from my home."	**0.18*****	0.06	0.005	119	0.06	0.07	0.39	119	0.04	0.04	0.40	119
	Comforts in walking[b]	"There are sidewalks on most of the streets." "The sidewalks are well maintained (e.g., paved, even, and not a lot of cracks)." "There are enough spaces (e.g., grass strip, trees) between the sidewalks and the vehicular roadways." "There are enough benches and other places to rest along the streets."	**0.23*****	0.07	0.001	119	0.10	0.07	0.16	119	0.06	0.04	0.21	119
	Crime safety[bc]	"There is a high crime rate in my neighborhood." "The crime rate in my neighborhood makes it unsafe to go on walks during the day." "The crime rate in my neighborhood makes it unsafe to go on walks at night."	**0.33*****	0.08	< 0.001	119	**0.33*****	0.08	< 0.001	119	**0.24*****	0.08	0.003	119

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 4-point scale from 1 = not at all to 4 = completely

[b] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly disagree

[c] Reversely coded

Table 44 (Continued)

Class	Predictor	Coding Scheme	Outcome 1				Outcome 2				Outcome 3			
			Neighborhood Cohesion[a]				Community Support[a]				Local Shopping Loyalty[a]			
			b	Robust S.E.	P>|t|	*N*	b	Robust S.E.	P>|t|	*N*	B	Robust S.E.	P>|t|	*N*
Neighborhood Environment	**Place Dependence[b]**	"My neighborhood is the best place for what I like to do." "No other place can compare to my neighborhood." "I get more satisfaction out ‘ of visiting my neighborhood than any other." "Doing what I do at my neighborhood is more important to me than doing it in any other place." "I wouldn't substitute any other area for doing the types of things I do at my neighborhood."	**0.54*** **	0.05	< 0.001	119	**0.45*** **	0.06	< 0.001	119	**0.29*** **	0.05	< 0.001	119
	Social Activity Places													
	Number of social activity places	"How many places do you visit for socialization at least once a week?" (ordinal)	**0.27*** **	0.05	< 0.001	119	**0.24*** **	0.05	< 0.001	119	**0.16*** **	0.04	< 0.001	119
	Frequency of social activity places	"How many times per week in total do you visit those places?" (ordinal)	**0.26*** **	0.06	< 0.001	119	**0.23*** **	0.06	< 0.001	119	**0.13*** **	0.04	< 0.001	119

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 4-point scale from 1 = not at all to 4 = completely

[b] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly disagree

Table 44 (Continued)

Class	Predictor	Coding Scheme	Outcome 1				Outcome 2				Outcome 3			
			Neighborhood Cohesion[a]				Community Support[a]				Local Shopping Loyalty[a]			
			b	Robust S.E.	P>|t|	*N*	b	Robust S.E.	P>|t|	*N*	b	Robust S.E.	P>|t|	*N*
Demographics	Sex	Female: 1(binary)	0.22	0.18	0.22	119	**0.49*** **	0.17	0.004	119	**0.22***	0.13	0.09	119
	Age	In years (continuous)	-0.004	0.006	0.44	119	0.008	0.006	0.21	119	0.005	0.004	0.29	119
	Race	White: 1(binary)	**-0.37***	0.20	0.06	119	0.13	0.22	0.54	119	0.12	0.14	0.38	119
	Education	College graduate or more: 1(binary)	-0.24	0.16	0.14	119	0.04	0.16	0.81	119	-0.04	0.11	0.73	119
	Marital status	Currently married: 1(binary)	-0.05	0.15	0.76	119	0.10	0.15	0.49	119	0.08	0.11	0.46	119
	Children in household	Children in household (<18yrs): 1(binary)	0.14	0.16	0.36	119	0.08	0.15	0.62	119	0.09	0.11	0.39	119
	Employment	Currently working: 1(binary)	0.23	0.16	0.16	119	0.17	0.16	0.29	119	0.11	0.11	0.32	119
	Household income	Annual household income before tax (ordinal)	**0.12****	0.06	0.04	119	**0.15****	0.06	0.013	119	**0.11*****	0.04	0.005	119
	Home ownership	Home owner: 1(binary)	0.010	0.16	0.95	119	**0.27***	0.15	0.08	119	**0.27****	0.11	0.02	119
	Housing type	Single family housing: 1(binary)	0.06	0.15	0.71	119	**0.32****	0.15	0.03	119	0.16	0.12	0.18	119
	Commute mode	Commute by driving alone: 1(binary)	0.14	0.15	0.38	119	0.13	0.15	0.40	119	-0.02	0.10	0.80	119
	Car ownership	Car owner: 1(binary)	-0.09	0.20	0.64	119	**0.30***	0.18	0.096	119	0.04	0.12	0.75	119
	Number of cars	Number of cars in household, 5 or more = 5 (continuous)	0.006	0.08	0.94	119	0.06	0.08	0.45	119	0.090	0.06	0.12	119
	Length of residency	Years and months living in the community (continuous)	0.003	0.006	0.65	119	0.005	0.01	0.50	119	0.005	0.006	0.40	119
	City size	Metropolitan area (50,000 ≤ Pop.): 1(binary)	-0.094	0.18	0.59	119	**-0.31***	0.17	0.07	119	-0.22	0.14	0.14	119
	Population density	Population density per square mile of land area (continuous)	**0.0002***	0.00	0.087	119	0.00004	0.0001	0.78	119	-7.35e	0.00	0.93	119
	Poverty rate by city	Poverty rate by city (continuous)	**0.02*****	0.007	0.002	119	0.01	0.01	0.106	119	**0.008***	0.00	0.09	119

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 4-point scale from 1 = not at all to 4 = completely

5.2.5.2. Multivariate Base Model

The initial multivariate base model was estimated with the 11 demographic variables (Table 45). Then, only six statistically significant variables at the 0.1 level (*sex, race, household income, home owner, city size*, and *poverty rate by city*) in the initial multivariate base model and two theoretically important variables (*children in household* and *length of residency*) were included in the final base model (Table 46).

The three final base models presented acceptable fits at the 0.1 level, capturing 16.8%, 15.5%, and 13% of the total variance in each model of *neighborhood cohesion, community support,* and *local shopping loyalt*y (Table 46).

Table 45

(SH1) Initial Base Model of Community Attachment: Adjusted Regression with Robust Standard Errors

Class	Predictor	Outcome 1				Outcome 2				Outcome 3			
		Neighborhood Cohesion[a]				Community Support[a]				Local Shopping Loyalty[a]			
		b	Robust S.E.	β	P>|t|	b	Robust S.E.	β	P>|t|	b	Robust S.E.	β	P>|t|
Demographics	**Female: 1(binary)**	0.18	0.16	0.10	0.251	**0.46*** **	0.16	0.25	0.005	0.18	0.13	0.13	0.164
	White: 1(binary)	**-0.49***	0.27	-0.18	0.072	-0.11	0.23	-0.04	0.654	-0.02	0.17	-0.01	0.896
	Children in household (<18yrs): 1(binary)	0.15	0.17	0.09	0.370	-0.01	0.17	0.00	0.965	0.08	0.12	0.07	0.472
	Household income	**0.18*** **	0.07	0.26	0.008	0.08	0.07	0.13	0.266	**0.08***	0.04	0.18	0.063
	Home owner: 1(binary)	-0.27	0.19	-0.16	0.175	-0.10	0.22	-0.06	0.645	0.13	0.15	0.11	0.379
	Single family housing: 1(binary)	0.00	0.19	0.00	0.984	0.19	0.21	0.10	0.377	-0.07	0.15	-0.06	0.634
	Car owner: 1(binary)	-0.14	0.23	-0.06	0.554	0.22	0.21	0.10	0.292	-0.08	0.15	-0.05	0.611
	Length of residency	0.00	0.01	0.07	0.477	0.00	0.01	0.03	0.765	0.00	0.01	0.07	0.639
	Metropolitan area (50,000 ≤ Pop.): 1(binary)	-0.19	0.19	-0.10	0.333	**-0.34***	0.19	-0.18	0.076	-0.14	0.16	-0.11	0.357
	Population density	0.00	0.00	-0.01	0.971	0.00	0.00	-0.05	0.784	0.00	0.00	-0.12	0.494
	Poverty rate by city	**0.02***	0.01	0.26	0.061	0.02	0.01	0.19	0.162	0.01	0.01	0.19	0.248
N			119				119				119		
F(11, 107)			2.73				2.57				1.28		
Prob > F			**0.0038**				**0.0063**				0.2458		
R-squared			0.171				0.172				0.139		

Non-significant variables were excluded except for the several theoretically significant variables (children in household, and length of residency).
* p<.1, ** p<.05, *** p<.01
β is fully standardized coefficient.
[a] Composite score, measured along a 4-point scale from 1 = not at all to 4 = completely

Table 46

(SH1) Final Base Model of Community Attachment: Adjusted Regression with Robust Standard Errors

Class	Predictor	Outcome 1				Outcome 2				Outcome 3			
		Neighborhood Cohesion[a]				Community Support[a]				Local Shopping Loyalty[a]			
		B	Robust S.E.	β	P>|t|	b	Robust S.E.	β	P>|t|	b	Robust S.E.	β	P>|t|
Demographics	Female: 1(binary)	0.18	0.16	0.10	0.246	**0.45*** **	0.16	0.24	0.006	0.19	0.12	0.14	0.130
	White: 1(binary)	**-0.50***	0.26	-0.19	0.056	-0.07	0.23	-0.03	0.764	-0.03	0.16	-0.02	0.844
	Children in household (<18yrs): 1(binary)	0.14	0.16	0.08	0.388	0.03	0.16	0.02	0.850	0.06	0.11	0.05	0.587
	Household income	**0.16****	0.06	0.24	0.011	0.12	0.07	0.18	0.111	0.07	0.04	0.14	0.112
	Home owner: 1(binary)	-0.27	0.18	-0.16	0.129	0.00	0.19	0.00	0.992	0.11	0.12	0.09	0.378
	Length of residency	0.00	0.01	0.06	0.529	0.00	0.01	0.05	0.565	0.00	0.01	0.07	0.611
	Metropolitan area (50,000 ≤ Pop.): 1(binary)	-0.21	0.18	-0.11	0.236	**-0.31***	0.16	-0.17	0.051	-0.20	0.15	-0.16	0.168
	Poverty rate by city	**0.02*****	0.01	0.27	0.003	0.01	0.01	0.13	0.154	0.01	0.00	0.11	0.196
N			119				119				119		
F(8, 110)			3.63				3.22				1.7		
Prob > F			**0.0009**				**0.0025**				**0.1064**		
R-squared			0.168				0.155				0.13		

Non-significant variables were excluded except for the several theoretically significant variables (children in household, and length of residency).
* p<.1, ** p<.05, *** p<.01
β is fully standardized coefficient.
[a] Composite score, measured along a 4-point scale from 1 = not at all to 4 = completely

5.2.5.3. Final Model

Results from multivariate analyses (the one-by-one test and final model) are presented in Table 47 and 48. After controlling for five socio-demographic and two neighborhood-related demographic variables, *CC membership*, and six subjectively measured neighborhood environmental variables were significant at the 0.1 level in the one-by-one tests (Table 47). The three final model sets including *CC membership*, two perceived walkability variables, *crime safety*, *place dependence*, and two social activity variables were also significant at the 0.1 or better level. The final model of *neighborhood cohesion* explained 57.1%, that of *community support* captured 47.2%, and that of *local shopping loyalt*y accounted for 43.6% of the total variance (Table 48).

CC membership was positively correlated with *community support* and *local shopping loyalt*y, and was statistically significant at the 0.1 or better level. *Crime safety* and *place dependence* had statistically positive relationships with all three dependent variables, *neighborhood cohesion, community support*, and *local shopping loyalt*y (Table 48). The *number of social activity places* was positively associated with *local shopping loyalt*y, at the 0.1 level. All demographic variables had no significant impact on the three dependent variables.

Table 47

(SH1) One-by-One Test of Community Attachment: Adjusted Regression with Robust Standard Errors†

Class	Predictor	Outcome 1					Outcome 2					Outcome 3				
		Neighborhood Cohesion[a]					Community Support[a]					Local Shopping Loyalty[a]				
		b	P>|t|	N	P>F	R2	B	P>|t|	N	P>F	R2	b	P>|t|	N	P>F	R2
CC Membership	CC member= 1(binary)	0.24	0.243	119	0.001	0.18	**0.43****	0.036	119	0.001	0.19	**0.34****	0.010	119	0.009	0.18
Neighborhood Environment	**Objective Walkability**															
	Destination accessibility	0.00	0.998	113	0.003	0.17	0.00	0.803	113	0.008	0.16	0.00	0.840	113	0.150	0.13
	Perceived Walkability															
	Access to services[b]	**0.13***	0.058	119	< 0.001	0.20	0.05	0.419	119	0.003	0.16	0.05	0.320	119	0.098	0.14
	Comforts in walking[b]	**0.18****	0.012	119	< 0.001	0.22	0.10	0.166	119	0.002	0.17	0.06	0.180	119	0.081	0.14
	Crime safety[b]	**0.33*****	< 0.001	119	< 0.001	0.24	**0.33*****	< 0.001	119	< 0.001	0.23	**0.26*****	0.003	119	0.008	0.22
	Place Dependence[b]	**0.49*****	< 0.001	119	< 0.001	0.50	**0.42*****	< 0.001	119	< 0.001	0.40	**0.27*****	< 0.001	119	< 0.001	0.34
	Social Activity Places															
	Number of social activity places	**0.23*****	< 0.001	119	< 0.001	0.28	**0.20*****	< 0.001	119	< 0.001	0.25	**0.14*****	< 0.001	119	< 0.001	0.22
	Frequency of social activity places	**0.21*****	< 0.001	119	< 0.001	0.24	**0.20*****	0.002	119	< 0.001	0.22	**0.12****	0.018	119	0.010	0.18

† All base model variables shown in Table 46 were controlled. Each independent variable was tested one at a time with the base model.
Non-significant variables were excluded except for the several theoretically significant variables.
* p<.1, ** p<.05, *** p<.01
[a] Composite score, measured along a 4-point scale from 1 = not at all to 4 = completely
[b] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly disagree

Table 48

(SH1) Final Model of Community Attachment: Adjusted Regression with Robust Standard Errors

Class	Predictor	Outcome 1 Neighborhood Cohesion[a]				Outcome 2 Community Support[a]				Outcome 3 Local Shopping Loyalty[a]			
		b	Robust S.E.	β	P>|t|	B	Robust S.E.	β	P>|t|	b	Robust S.E.	β	P>|t|
CC membership	CC member= 1(binary)	0.07	0.16	0.04	0.650	**0.27***	0.15	0.16	0.077	**0.25****	0.12	0.21	0.034
Neighborhood Environment	**Perceived Walkability**												
	Access to services[b]	0.01	0.06	0.02	0.871	-0.03	0.06	-0.04	0.673	0.004	0.05	0.01	0.937
	Comforts in walking[c]	0.10	0.06	0.14	0.112	0.06	0.07	0.08	0.390	0.03	0.05	0.06	0.518
	Crime safety[b]	**0.17****	0.07	0.18	0.017	**0.19****	0.08	0.19	0.021	**0.16****	0.07	0.24	0.022
	Place Dependence[b]	**0.39*****	0.07	0.49	< 0.001	**0.31*****	0.07	0.39	< 0.001	**0.18*****	0.05	0.33	0.001
	Social Activity Places												
	Number of social activity places	0.06	0.06	0.09	0.372	0.07	0.07	0.11	0.290	**0.08***	0.05	0.18	0.091
	Frequency of social activity places	0.10	0.07	0.14	0.139	0.09	0.07	0.13	0.204	0.02	0.05	0.04	0.700
Demographics	Female: 1(binary)	-0.03	0.11	-0.02	0.754	0.21	0.15	0.11	0.149	0.01	0.11	0.00	0.960
	White: 1(binary)	-0.13	0.23	-0.05	0.586	0.28	0.20	0.11	0.168	0.22	0.17	0.12	0.193
	Children in household (<18yrs): 1(binary)	-0.01	0.14	-0.01	0.933	-0.08	0.14	-0.05	0.563	-0.03	0.09	-0.02	0.767
	Household income	0.05	0.05	0.08	0.286	0.02	0.06	0.04	0.668	0.001	0.04	0.00	0.990
	Home owner: 1(binary)	-0.09	0.16	-0.05	0.565	0.05	0.15	0.03	0.761	0.13	0.12	0.11	0.272
	Length of residency	0.004	0.01	0.05	0.501	0.01	0.00	0.07	0.290	0.005	0.01	0.09	0.410
	Metropolitan area (50,000 ≤ Pop.): 1(binary)	0.09	0.19	0.05	0.631	0.08	0.17	0.04	0.629	0.11	0.14	0.08	0.451
	Poverty rate by city	0.01	0.01	0.08	0.274	-0.001	0.01	-0.02	0.808	-0.002	0.01	-0.04	0.644
N			119				119				119		
F(15, 103)			15.05				7.28				6.78		
Prob > F			**< 0.001**				**< 0.001**				**< 0.001**		
R-squared			0.571				0.472				0.436		

Non-significant variables were excluded except for the several theoretically significant variables.
* p<.1, ** p<.05, *** p<.01
β is fully standardized coefficient.
Robust S.E is robust standard error.
[a] Composite score, measured along a 4-point scale from 1 = not at all to 4 = completely
[b] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly disagree

5.2.6. Secondary Hypothesis 2-1, 2-2, and 2-3: Correlate between Community Attachment and Quality of Life

There were no correcting functional forms for the normality of four dependent variables – *physical and material well-being, relations with other people, social/community/ civic activities,* and *personal development and fulfillment*. Thus, a regression with robust standard errors was used for examining secondary hypothesis 2 to handle the normality issue.

5.2.6.1. Unadjusted Analyses

The bivariate results indicated that *CC membership* and all three community attachment factors – *neighborhood cohesion*, *community support*, and *local shopping loyalty* – had significantly positive relationships with all five quality of life factors at the 0.1 or better level (Table 49). 12 statistically significant demographic variables in unadjusted analyses were selected when developing the base model.

Table 49

(SH2-1, 2-2, and 2-3) Bivariate Correlates of Quality of Life: Unadjusted Regression with Robust Standard Errors (Total *N*=119)

Class	Predictor	Coding Scheme	Outcome 1			Outcome 2		
			Physical and Material Well-Being[a]			Relations with Other People[a]		
			b	Robust S.E.	P>|t|	b	Robust S.E.	P>|t|
CC Membership		CC member: 1(binary)	**1.12*** **	0.26	< 0.001	**0.93*** **	0.22	< 0.001
Community Attachment	Neighborhood cohesion[b]	"I can get what I need in this neighborhood." "This neighborhood helps me fulfill my needs." "I feel like a member of this neighborhood." "I belong in this neighborhood." "I have a say about what goes on in my neighborhood." "People in this neighborhood are good at influencing each another." "I feel connected to this neighborhood." "I have a good bond with others in this neighborhood."	**0.63*** **	0.15	< 0.001	**0.57*** **	0.12	< 0.001
	Community support[b]	"I am actively involved in community issues and activities." "I would do my best to enhance the development of my neighborhood." "I would be willing to provide financial support for the development of my community."	**0.75*** **	0.13	< 0.001	**0.67*** **	0.11	< 0.001
	Local shopping loyalty[b]	"I shop outside my local retail area before looking to see what is offered locally." (a reverse coding item) "I shop locally because the convenience outweighs the other advantages of shopping outside the community." "I will increase my interest in local stores when more goods/services are made available through them." "I will pay slightly more for products if I can buy them locally." "I shop at local stores because it is important to help my community." "I shop locally to support the local merchants and business district." "Shopping at local stores is an enjoyable experience." "Because I am more familiar with local stores, I prefer shopping locally rather than out of town." "I shop locally even when the selection/variety of goods is poor." "I am loyal to my local shopping area."	**1.29*** **	0.17	< 0.001	**0.88*** **	0.17	< 0.001

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 7-point scale from 1 = terrible to 7 = delighted

[b] Composite score, measured along a 4-point scale from 1 = not at all to 4 = completely

Table 49 (Continued)

Class	Predictor	Outcome 3			Outcome 4			Outcome 5		
		Social, Community, and Civic activities[a]			Personal Development and Fulfillment[a]			Recreation[a]		
		b	Robust S.E.	P>|t|	b	Robust S.E.	P>|t|	b	Robust S.E.	P>|t|
CC Membership		**1.49*** **	0.24	< 0.001	**0.87*** **	0.21	< 0.001	**0.75*** **	0.23	0.001
Community Attachment	Neighborhood cohesion[b]	**0.84*** **	0.14	< 0.001	**0.68*** **	0.12	< 0.001	**0.72*** **	0.11	< 0.001
	Community support[b]	**0.95*** **	0.12	< 0.001	**0.69*** **	0.10	< 0.001	**0.66*** **	0.11	< 0.001
	Local shopping loyalty[b]	**1.20*** **	0.17	< 0.001	**0.91*** **	0.14	< 0.001	**0.84*** **	0.17	< 0.001

* p<.1, ** p<.05, *** p<.01
[a] Composite score, measured along a 7-point scale from 1 = terrible to 7 = delighted
[b] Composite score, measured along a 4-point scale from 1 = not at all to 4 = completely

Table 49 (Continued)

Class	Predictor	Coding Scheme	Outcome 1			Outcome 2		
			Physical and Material Well-Being[a]			Relations with Other People[a]		
			b	Robust S.E.	P>|t|	b	Robust S.E.	P>|t|
Demographics	Sex	Female: 1(binary)	**0.57****	0.28	0.047	0.23	0.26	0.383
	Age	In years (continuous)	**0.02***	0.01	0.086	0.01	0.01	0.200
	Race	White: 1(binary)	-0.30	0.35	0.391	-0.04	0.26	0.892
	Education	College graduate or more: 1(binary)	**0.43**	0.25	0.102	0.16	0.23	0.485
	Marital status	Currently married: 1(binary)	**0.48****	0.24	0.044	**0.60*****	0.21	0.005
	Children in household	Children in household (<18yrs): 1(binary)	0.02	0.25	0.935	0.30	0.20	0.141
	Employment	Currently working: 1(binary)	0.39	0.25	0.127	0.12	0.22	0.591
	Household income	Annual household income before tax (ordinal)	**0.49*****	0.08	< 0.001	**0.27*****	0.08	0.001
	Home ownership	Home owner: 1(binary)	**1.06*****	0.24	< 0.001	**0.57****	0.23	0.012
	Housing type	Single family housing: 1(binary)	**1.14*****	0.26	< 0.001	**0.43***	0.23	0.066
	Commute mode	Commute by driving alone: 1(binary)	0.18	0.24	0.467	0.30	0.23	0.193
	Car ownership	Car owner: 1(binary)	**0.94*****	0.28	0.001	**0.76****	0.32	0.018
	Number of cars	Number of cars in household, 5 or more = 5 (continuous)	**0.33*****	0.12	0.008	**0.30*****	0.11	0.006
	Length of residency	Years and months living in the community (continuous)	0.01	0.01	0.346	-0.01	0.01	0.415
	City size	Metropolitan area (50,000 ≤ Pop.): 1(binary)	-0.22	0.30	0.468	-0.27	0.22	0.217
	Population density	Population density per square mile of land area (continuous)	0.0002	0.0002	0.398	0.00001	0.0001	0.967
	Poverty rate by city	Poverty rate by city (continuous)	0.02	0.01	0.157	0.01	0.01	0.502

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 7-point scale from 1 = terrible to 7 = delighted

Table 49 (Continued)

Class	Predictor	Outcome 3			Outcome 4			Outcome 5		
		Social, Community, and Civic activities[a]			Personal Development and Fulfillment[a]			Recreation[a]		
		b	Robust S.E.	P>|t|	B	Robust S.E.	P>|t|	b	Robust S.E.	P>|t|
Demographics	Sex	0.33	0.29	0.262	0.29	0.23	0.213	0.40	0.25	0.112
	Age	**0.02****	0.01	0.018	**0.01***	0.01	0.083	0.01	0.01	0.112
	Race	-0.08	0.33	0.812	-0.29	0.29	0.304	**-0.59***	0.31	0.064
	Education	0.17	0.26	0.512	0.28	0.22	0.196	**0.44***	0.22	0.053
	Marital status	0.29	0.24	0.233	0.24	0.21	0.243	**0.37***	0.22	0.095
	Children in household	0.14	0.24	0.554	0.05	0.20	0.790	0.06	0.22	0.775
	Employment	-0.05	0.28	0.865	0.27	0.23	0.242	0.33	0.25	0.182
	Household income	**0.27*****	0.08	0.002	**0.25*****	0.08	0.003	**0.24*****	0.09	0.009
	Home ownership	**0.52****	0.26	0.049	**0.41***	0.22	0.063	**0.38**	0.23	0.102
	Housing type	**0.66*****	0.25	0.009	**0.52****	0.23	0.026	0.35	0.23	0.139
	Commute mode	0.12	0.25	0.633	**0.34**	0.21	0.107	0.21	0.21	0.319
	Car ownership	**0.68****	0.26	0.010	**0.89*****	0.28	0.002	**0.61****	0.25	0.017
	Number of cars	0.18	0.13	0.175	**0.23***	0.12	0.063	0.13	0.14	0.353
	Length of residency	0.01	0.02	0.617	0.01	0.01	0.332	0.002	0.01	0.851
	City size	-0.45	0.29	0.124	-0.15	0.25	0.543	-0.07	0.26	0.799
	Population density	0.00003	0.0002	0.882	-0.000001	0.0002	0.997	-0.00005	0.0002	0.761
	Poverty rate by city	**0.02***	0.01	0.077	0.01	0.01	0.213	0.01	0.01	0.206

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 7-point scale from 1 = terrible to 7 = delighted

5.2.6.2. Multivariate Base Model

From the initial multivariate base model (Table 50), which included 12 demographic variables, only six statistically significant variables (sex, age, race, household income, housing type, and car ownership) and two other theoretically significant variables (marital status and poverty rate by city) were added into the final multivariate base model (Table 51).[53] All final multivariate base models were statistically significant at the level of 0.1 or better. The final multivariate base model captured 34.07%, 13.49%, 16.26%, 19.54% and 17.48% of each model of *physical and material well-being, relations with other people, social/community/ civic activities, personal development and fulfillment* and *recreation,* respectively (Table 51).

[53] Secondary hypothesis 2-2: higher socioeconomic status will increase the quality of life for both CC users and nonusers.

Table 50

(SH2-1, 2-2, and 2-3) Initial Base Model of Quality of Life: Adjusted Regression with Robust Standard Errors

Class	Predictor	Outcome 1			Outcome 2			Outcome 3			Outcome 4			Outcome 5		
		Physical and Material Well-Being[a]			Relations with Other People[a]			Social, Community, and Civic activities[a]			Personal Development and Fulfillment[a]			Recreation[a]		
		b	β	P>|t|	b	β	P>|t|	b	B	P>|t|	b	β	P>|t|	b	β	P>|t|
Demographics	Female: 1(binary)	**0.45***	0.15	0.084	0.10	0.04	0.724	0.28	0.10	0.341	0.21	0.08	0.378	0.23	0.09	0.335
	Age	0.01	0.09	0.386	0.01	0.07	0.598	**0.02***	0.24	0.055	0.01	0.16	0.188	**0.01***	0.16	0.084
	White: 1(binary)	**-0.86****	-0.20	0.018	-0.38	-0.10	0.222	-0.57	-0.14	0.128	**-0.68****	-0.19	0.027	**-0.94*****	-0.25	0.002
	College graduate or more: 1(binary)	0.12	0.04	0.579	0.04	0.02	0.857	0.03	0.01	0.901	0.20	0.09	0.358	0.34	0.14	0.128
	Currently married: 1(binary)	-0.40	-0.15	0.128	0.19	0.08	0.450	-0.22	-0.08	0.513	-0.31	-0.14	0.198	0.01	0.00	0.975
	Household income	**0.38*****	0.36	< 0.001	0.14	0.15	0.201	0.20	0.19	0.110	**0.18**	0.20	0.106	**0.22***	0.24	0.080
	Home owner: 1(binary)	0.26	0.10	0.402	0.19	0.08	0.599	-0.28	-0.10	0.485	-0.19	-0.08	0.504	-0.11	-0.05	0.742
	Single family housing: 1(binary)	**0.51***	0.17	0.097	-0.15	-0.06	0.617	0.40	0.14	0.261	0.17	0.07	0.506	-0.03	-0.01	0.935
	Commute by driving alone: 1(binary)	-0.28	-0.10	0.338	0.04	0.02	0.876	-0.17	-0.06	0.600	-0.02	-0.01	0.940	0.05	0.02	0.836
	Car owner: 1(binary)	0.52	0.15	0.240	0.34	0.11	0.386	0.34	0.10	0.440	**0.66**	0.22	0.107	0.30	0.10	0.441
	Number of cars	0.03	0.02	0.827	0.11	0.09	0.410	0.09	0.07	0.641	0.14	0.12	0.414	0.01	0.01	0.964
	Poverty rate by city	0.01	0.07	0.429	0.01	0.08	0.335	0.02	0.13	0.143	0.02	0.14	0.122	0.01	0.12	0.173
N			119			119			119			119			119	
F(12, 106)			5.29			1.42			2.85			2.48			2.2	
Prob > F			**< 0.001**			0.1683			**0.002**			**0.0067**			**0.0167**	
R-squared			0.3566			0.1466			0.1696			0.2094			0.1929	

Non-significant variables were excluded.
* p<.1, ** p<.05, *** p<.01
[a] Composite score, measured along a 7-point scale from 1 = terrible to 7 = delighted.

Table 51

(SH2-1, 2-2, and 2-3) Final Base Model of Quality of Life: Adjusted Regression with Robust Standard Errors

Class	Predictors	Outcome 1			Outcome 2			Outcome 3			Outcome 4			Outcome 5		
		Physical and Material Well-Being[a]			Relations with Other People[a]			Social, Community, and Civic activities[a]			Personal Development and Fulfillment[a]			Recreation[a]		
		b	β	P>|t|	b	β	P>|t|	B	B	P>|t|	b	β	P>|t|	b	β	P>|t|
Demographics	Female: 1(binary)	**0.44***	0.15	0.084	0.11	0.04	0.666	0.24	0.08	0.401	0.21	0.08	0.347	0.28	0.11	0.229
	Age	0.01	0.13	0.165	0.01	0.08	0.491	**0.02***	0.22	0.069	0.01	0.13	0.233	**0.01**	0.16	0.104
	White: 1(binary)	**-0.86****	-0.20	0.012	-0.36	-0.10	0.230	-0.55	-0.13	0.134	**-0.66****	-0.19	0.032	**-0.96*****	-0.26	0.003
	Currently married: 1(binary)	-0.33	-0.12	0.185	0.25	0.11	0.280	-0.20	-0.08	0.506	-0.27	-0.12	0.195	-0.01	0.00	0.977
	Household income	**0.42*****	0.40	< 0.001	**0.18***	0.20	0.075	**0.21***	0.20	0.075	**0.20****	0.23	0.035	**0.23***	0.24	0.062
	Single family housing: 1(binary)	**0.64****	0.22	0.030	-0.03	-0.01	0.916	0.27	0.09	0.362	0.11	0.04	0.630	-0.06	-0.02	0.823
	Car owner: 1(binary)	0.26	0.07	0.479	0.38	0.13	0.258	0.30	0.08	0.400	**0.73****	0.25	0.038	0.35	0.11	0.303
	Poverty rate by city	0.01	0.07	0.391	0.01	0.06	0.398	0.02	0.13	0.135	0.01	0.12	0.168	0.01	0.11	0.208
N			119			119			119			119			119	
F(8, 110)			7.36			1.9			3.13			3.3			2.91	
Prob > F			**< 0.001**			**0.0667**			**0.0032**			**0.002**			**0.0055**	
R-squared			0.3407			0.1349			0.1626			0.1954			0.1748	

Non-significant variables were excluded.
* p<.1, ** p<.05, *** p<.01
[a] Composite score, measured along a 7-point scale from 1 = terrible to 7 = delighted.

5.2.6.3. Final Model

Five final models of *physical and material well-being, relations with other people, social/community/civic activities, personal development and fulfillment,* and *recreation* included four statistically significant independent variables (*CC membership, neighborhood cohesion, community support,* and *local shopping loyalty*) that were selected from the one-by-one tests (Table 52). All five final models showed adequate fits at the 0.1 or better level, and explained 55.5%, 37.3%, 56.4%, 45.3%, and 39.6% of the total variance, respectively (Table 53).

In the final model, CC membership had significantly positive associations with *relations with other people, social/community/civic activities,* and *personal development and fulfillment* (b= 0.51, 1.09, and 0.45, respectively). *Neighborhood cohesion* presented positive relationships with *social/community civic activities, personal development and fulfillment* and *recreation* (b= 0.34, 0.36, and 0.47, respectively). *Community support* had significantly positive correlations with *relations with other people,* and *social/community/civic activities* (b= 0.33 and 0.42, respectively). *Local shopping loyalty* had significantly positive associations with *physical and material well-being* (b=0.94).

For those who were non-whites, there were significantly positive relationships with all of the quality of life factors except for *relations with other people.* For those who were not married, had higher incomes, and lived in single family housing, there was a statistically positive relationship with *physical and material well-being.* Car ownership was positively correlated with *personal development and fulfillment.*

Table 52

(SH2-1, 2-2, and 2-3) One-by-One Test of Quality of Life: Adjusted Regression with Robust Standard Errors†

Class	Predictors	Outcome 1					Outcome 2				
		Physical and Material Well-Being[a]					Relations with Other People[a]				
		b	P>|t|	*N*	P>F	R2	b	P>|t|	*N*	P>F	R2
CC Membership	CC member: 1(binary)	**0.86*** **	0.001	119	< 0.001	0.405	**0.88*** **	< 0.001	119	0.002	0.223
Community Attachment	Neighborhood cohesion	**0.50*** **	< 0.001	119	< 0.001	0.422	**0.58*** **	< 0.001	119	< 0.001	0.284
	Community support	**0.54*** **	< 0.001	119	< 0.001	0.436	**0.63*** **	< 0.001	119	< 0.001	0.310
	Local shopping loyalty	**1.06*** **	< 0.001	119	< 0.001	0.535	**0.82*** **	< 0.001	119	< 0.001	0.286

† All base model variables shown in Table 51 were controlled. Each independent variable was tested one at a time with the base model.
* p<.1, ** p<.05, *** p<.01
[a] Composite score, measured along a 7-point scale from 1 = terrible to 7 = delighted.

Table 52 (Continued)

Class	Predictors	Outcome 3					Outcome 4					Outcome 5				
		Social, Community, and Civic activities[a]					Personal Development and Fulfillment[a]					Recreation[a]				
		b	P>|t|	*N*	P>F	R2	B	P>|t|	*N*	P>F	R2	b	P>|t|	*N*	P>F	R2
CC Membership	CC member: 1(binary)	**1.54*** **	< 0.001	119	< 0.001	0.368	**0.81*** **	0.001	119	< 0.001	0.274	**0.63** **	0.015	119	0.001	0.220
Community Attachment	Neighborhood cohesion	**0.84*** **	< 0.001	119	< 0.001	0.398	**0.66*** **	< 0.001	119	< 0.001	0.398	**0.68*** **	< 0.001	119	< 0.001	0.372
	Community support	**0.88*** **	< 0.001	119	< 0.001	0.423	**0.61*** **	< 0.001	119	< 0.001	0.368	**0.59*** **	< 0.001	119	< 0.001	0.326
	Local shopping loyalty	**1.09*** **	< 0.001	119	< 0.001	0.367	**0.82*** **	< 0.001	119	< 0.001	0.359	**0.74*** **	< 0.001	119	< 0.001	0.298

† All base model variables shown in Table 51 were controlled. Each independent variable was tested one at a time with the base model.
* p<.1, ** p<.05, *** p<.01
[a] Composite score, measured along a 7-point scale from 1 = terrible to 7 = delighted.

Table 53

(SH2-1, 2-2, and 2-3) Final Model of Quality of Life: Adjusted Regression with Robust Standard Errors

Class	Predictor	Outcome 1			Outcome 2			Outcome 3			Outcome 4			Outcome 5		
		Physical and Material Well-Being[a]			Relations with Other People[a]			Social, Community, and Civic activities[a]			Personal Development and Fulfillment[a]			Recreation[a]		
		b	β	P>|t|	b	β	P>|t|	B	β	P>|t|	b	β	P>|t|	b	β	P>|t|
CC membership	CC member= 1(binary)	0.39	0.14	0.112	**0.51****	0.21	0.022	**1.09*****	0.40	< 0.001	**0.45***	0.19	0.069	0.30	0.12	0.256
Community Attachment	Neighborhood cohesion	-0.12	-0.08	0.460	0.16	0.11	0.387	**0.34***	0.21	0.058	**0.36***	0.27	0.058	**0.47****	0.34	0.004
	Community Support	0.18	0.12	0.257	**0.33***	0.24	0.079	**0.42****	0.26	0.020	0.20	0.15	0.283	0.18	0.13	0.298
	Local shopping loyalty	**0.94*****	0.41	< 0.001	0.29	0.15	0.192	0.20	0.09	0.331	0.23	0.12	0.236	0.10	0.05	0.670
Demographics	Female: 1(binary)	0.10	0.03	0.661	-0.26	-0.10	0.273	-0.33	-0.11	0.132	-0.11	-0.04	0.580	0.01	0.01	0.952
	Age	0.00	0.03	0.743	0.00	-0.03	0.777	0.00	0.05	0.562	0.00	0.05	0.635	0.01	0.11	0.130
	White: 1(binary)	**-0.96*****	-0.23	0.001	-0.33	-0.09	0.211	**-0.49***	-0.12	0.097	**-0.55***	-0.15	0.056	**-0.78****	-0.21	0.011
	Currently married: 1(binary)	**-0.32***	-0.12	0.095	0.28	0.12	0.159	-0.24	-0.09	0.274	-0.23	-0.10	0.181	0.07	0.03	0.728
	Household income	**0.31*****	0.30	< 0.001	0.08	0.08	0.313	0.07	0.06	0.370	0.08	0.09	0.248	0.11	0.11	0.259
	Single family housing: 1(binary)	**0.52****	0.18	0.028	-0.13	-0.05	0.565	0.11	0.04	0.631	0.05	0.02	0.783	-0.08	-0.03	0.729
	Car owner: 1(binary)	0.33	0.09	0.299	0.37	0.12	0.243	0.26	0.07	0.337	**0.74*****	0.25	0.008	0.35	0.11	0.260
	Poverty rate by city	0.003	0.02	0.740	0.00	-0.03	0.677	0.00	0.00	0.948	0.00	0.00	0.978	0.00	-0.01	0.891
N		119			119			119			119			119		
F(12, 106)		15.04			8.13			13.29			9.90			7.43		
Prob > F		**< 0.001**			**< 0.001**			**< 0.001**			**< 0.001**			**< 0.001**		
R-squared		0.555			0.373			0.564			0.453			0.396		

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 7-point scale from 1 = terrible to 7 = delighted

6. DISCUSSION AND CONCLUSION

The main purpose of the present study was three-fold: (1) to investigate the role of neighborhood environments on CC participation and members' CC activities; (2) to understand if community attachment is influenced by CC activities and satisfaction; and (3) to examine the impact of CC activities on quality of life. This section includes a summary of key findings, their significance, and study limitations.

6.1. SUMMARY

Findings from the present study generally supported the hypotheses listed in Table 54. First, objective and subjective measures of neighborhood environments positively influenced the incidence of CC membership, the levels of members' CC activities, and community attachment. Second, among CC users, CC activities and satisfaction with CC was positively associated with community attachment and QOL factors. Third, CC membership, community attachment, and residents' socioeconomic status was positively related to QOL factors. For ease of understanding, study findings, method of analysis, and corresponding hypotheses are shown in Table 54.

Also, there were statistically significant confounding factors associated with neighborhood environments, CC activities and satisfaction, community attachment, as well as QOL. Poverty rate by city was the only confounding factor that was statistically significant in the four variable groups (e.g., neighborhood environments; see Table 55). The confounding variables are discussed in more detail in the Implications section.

Table 54

Study Summary

Hypotheses		Method	Result
Primary Hypotheses			
Hypothesis 1-1 (PH1-1)	Those living in higher-walkability neighborhoods will participate in CC activities than those living in lower-walkability neighborhoods.	Multivariate Logistic Regression	Supported: • Objectively measured physical environments (*destination accessibility*) and subjectively measured *place dependence* positively influenced the incidence of CC membership.
Hypothesis 1-2 (PH1-2)	Among CC users, those living in higher-walkability neighborhoods will participate in CC activities than those living in lower-walkability neighborhood environments.	Multivariate Logistic Regression	Supported: • Those who lived in areas with higher levels of *access to services* were more likely to exchange more *kinds of goods and services*. • Those who had more s*ocial activity places* were more likely to *participate in CC events*.
Hypothesis 2 (PH2)	Among CC users, more frequent CC activities will increase their level of community attachment.	Regression with Robust Standard Errors	Supported: • Those who *used more time credits for obtaining services* showed lower levels of *neighborhood cohesion* and *local shopping loyalty*. • Those who *received more time credits for providing services* showed higher levels of *neighborhood cohesion* and *local shopping loyalty*. • *Social satisfaction with CC* was positively correlated with *neighborhood cohesion* and *local shopping loyalty.*
Hypothesis 3 (PH3)	Among CC users, more frequent CC activities will enhance their quality of life.	Regression with Robust Standard Errors	Supported: • Those with higher levels of social satisfaction with CC showed higher levels of quality of life related to *physical/material well-being, social/community/civic activities*, and *personal development/fulfillment*. • Those with longer CC membership showed higher levels of quality of life related to *physical/material well-being* and *relations with other people.*

Note: All results are significant at the 0.1 level.

Table 54 (Continued)

Hypotheses		Method	Result
Secondary Hypotheses			
Hypothesis 1 (SH1)	Among both CC users and nonusers, those living in higher-walkability neighborhoods will show higher levels of community attachment than those living in lower-walkability neighborhoods.	Regression with Robust Standard Errors	Supported: • CC members showed higher levels of *community support* and *local shopping loyalty*, compared to nonmembers. • Those who lived *in safer areas from crime* and showed higher levels of *place dependence* showed higher levels of all community attachment factors: *neighborhood cohesion, community support,* and *local shopping loyalty.* • Those with more *social activity places* showed higher levels of *local shopping loyalty.*
Hypothesis 2-1 (SH2-1)	Among both CC users and nonusers, those with a greater level of community attachment will also enjoy a higher quality of life than those with lower levels of community attachment.	Regression with Robust Standard Errors	Supported: • Those with higher levels of *neighborhood cohesion* showed higher levels of quality of life related to *social/community/civic activities,* and *personal development/fulfillment,* and *recreation.* • Those with higher levels of *community support* showed higher levels of quality of life related to *relations with other people* and *social/community/civic activities.* • Those with higher levels of *local shopping loyalty* showed higher levels of quality of life related to *physical/material well-being.*
Hypothesis 2-2 (SH2-2)	CC users will enjoy a higher quality of life than nonusers living in neighborhoods with physical environments similar to those of CC users.	Regression with Robust Standard Errors	Supported: • CC members showed higher levels of quality of life related to *relationship with other people, social/community/civic activities,* and *personal development/fulfillment*.
Hypothesis 2-3 (SH2-3)	Higher socioeconomic status will increase the quality of life for both CC users and nonusers living in physical neighborhood environments similar to those of CC users.	Regression with Robust Standard Errors	Supported: • For those who had higher incomes and lived in single family housing, there was a statistically positive relationship with *physical and material well-being*. Car ownership was positively correlated with *personal development and fulfillment*.

Note: All results are significant at the 0.1 level.

Table 55

Significance of Confounding Factors

Class	Neighborhood Environment (N=119)	CC activities and Satisfaction (N=77)	Community Attachment (N=119)	Quality of Life (N=119)
Personal-Socio-demographic	**Gender** **Age** **Race** Education	Gender Age Race Education	**Gender** Age **Race** Education	**Gender** **Age** **Race** **Education**
Personal-Economic-demographic	**Annual household income** **Employment status** **Home ownership** **Car ownership** **Number of cars in the household**	Annual household income Employment status Home ownership Car ownership Number of cars in the household	**Annual household income** Employment status **Home ownership** Car ownership Number of cars in the household	**Annual household income** Employment status **Home ownership** **Car ownership** **Number of cars in the household**
Household/ Community	**Marital status** **Dependent children** **Commute mode** **Housing type** **Length of residency** **City size** **Population density by city** **Poverty rate by city**	**Marital status** Dependent children **Commute mode** Housing type Length of residency City size **Population density by city** **Poverty rate by city**	Marital status Dependent children Commute mode **Housing type** Length of residency City size **Population density by city** **Poverty rate by city**	**Marital status** Dependent children Commute mode **Housing type** Length of residency City size Population density by city **Poverty rate by city**

Note: Bolded factors are significant at the 0.1 level.

6.2. IMPLICATIONS

6.2.1. Positive Impacts of Walkable Neighborhood Environments on the Recruitment and Activities of CC members

As advocated by new urbanism, a more walkable neighborhood with well-connected street patterns tends to create or improve social capital and encourage civic engagement through informal and spontaneous encounters with other neighbors (Leyden et al., 2011; Leyden et al., 2011; Leyden, 2003; Lund, 2002; Lund, 2003; Rogers, Shannon Rogers, John Halstead, Kevin Gardner,Cynthia Carlson, 2011). While the roles of the neighborhood physical environment on social connectedness have been examined

in a number of studies, their impacts on actual social movements or civic/community engagement have not been scrutinized sufficiently.

For example, Knudsen and Clark (2013) showed that density (population, retail, housing, and employment) and connectivity (city block density) can increase the incidence of social movement organizations (SMOs). However, their study could not explain the relationships between neighborhood environments and the regions of membership, or actual members' activities because they used secondary data. This data included: addresses of SMOs' registered offices and data from the ZIP Code Business Patterns and U.S. Census. To explain these relationships, the present study collected primary data — from CC nonusers against those of CC users. Furthermore, survey data was collected to assess members' actual activities in relation to neighborhood environments.

The present study in PH1-1[54] found a statistically significant and positive correlation between objectively measured physical environments (*destination accessibility*) and the incidence of CC membership in the adjusted model with the full sample. This finding extends the previous work by Knudsen and Clark (2013) that suggests that walkable neighborhoods increase the likelihood of residents' actual participation in civic activities, resulting in more socially coherent cities. Furthermore, as expected, findings from the present study revealed a statistically significant and positive relationship between *place dependence* (one of subjectively measured physical

[54] Primary hypothesis 1-1: Those living in higher-walkability neighborhoods will participate in CC activities than those living in lower-walkability neighborhoods.

environments) and the incidence of CC membership. Thus, these findings suggest that if individuals are emotionally attached to their neighborhoods, they are more likely to be involved in community activities for neighborhood improvement.

In addition, the present study in PH1-2[55] revealed a significant and positive association between perceived *access to services* and the *number of kinds of goods and services* exchanged with CC, after controlling for both neighborhood environment and demographic factors in the regression model. These findings suggest that perceived walkability in terms of *access to services* is a more significant predictor of CC activity, compared to objectively measured walkability. The present study employed Walk Score to objectively measure walkability. Walk Score is a composite score based on the proximity of an individual's address to nearby amenities, such as grocery stores, parks, and restaurants (Walk Score, 2016). However, individuals' preferences for specific amenities are not considered. In other words, composite scores are based on amenity proximity not preference. Walk Score does not consider whether people of varied socioeconomic and demographic characteristics (e.g., age, gender, and race/ethnicity) would regard all destinations equally, and does not acknowledge the size and frequency of use of destinations (Duncan et al., 2011; Pivo & Fisher, 2011). Thus, there might be a discrepancy between objectively measured and subjectively measured walkability.

Subjectively measured walkability (perceived walkability) reflects individuals' preferences, actual recognition, and use of the amenities (destinations). This finding is

[55] Primary hypothesis 1-2: Among CC users, those living in higher-walkability neighborhoods will participate in CC activities than those living in lower-walkability neighborhood environments.

supported by previous studies: perceived physical environments play a more critical role in enhancing social capital and community attachment rather than objectively measured neighborhood environments (Jun & Hur, 2015; Kweon et al., 2006; Wood & Giles-Corti, 2008). Thus, people who reported a higher level of perceived walkability engaged in CC exchanges involving more diverse kinds of goods and services.

To conclude, based on the findings in PH1-1 and PH1-2, CC organizations should actively recruit members in highly walkable areas where diverse amenities are concentrated. Conversely, because people in less walkable areas were found to have had fewer opportunities to participate in CC, CC staff would need to facilitate connections among CC members in less walkable areas. Thus, improving local pedestrian infrastructure would be necessary for CC to be more successful in less walkable areas.

6.2.1.1. Significant Demographic Factors Contributing to CC Participation

After controlling for demographic and neighborhood environment factors, the incidence of CC membership was positively associated with being female, increasing with age, being married, living in a single family home, owning a car, and living in a smaller town. Moreover, living in a smaller town was the most powerful predictor of the incidence of CC membership. These findings support previous social capital studies. For instance, community engagement, such as participating in community organizations/activities, has been demonstrated to increase levels of a sense of community, specifically in older and married populations (Fone et al., 2006; Larsen et al., 2004; Leyden et al., 2011; Nasar & Julian, 1995; Wood & Giles-Corti, 2008).

Yet, several statistically significant predictors were counterintuitive or inconsistent with previous CC research. For example, the predictors of increasing age, being married, and living in a smaller town contradict Collom's findings. Collom (2005) indicated that cities with CC systems are characterized by multiple key factors such as: younger people, more well-educated populations, more unmarried people, more non-whites, more non-homeowners, lower residential stability, larger population size, lower household incomes, higher unemployment and self-employment rates, and higher poverty rates. The literature generally considers these factors as social movement impacts.

Moreover, Collom (2005) classified CC systems into active and inactive CC systems. In Collom's study (2005), cities with active CC systems had populations that were younger, well-educated, single, and transient, compared to U.S. cities with inactive CC systems. One possible explanation for this discrepancy is that the present study investigated only one active CC system, while Collom assessed almost eighty CC systems (14 active and 64 inactive systems) in the U.S. Further study is needed to understand these relationships — more CC systems located in different regions with larger sample sizes for each CC system.

Findings from both the present study suggest that recruiting from certain demographic categories is important. Therefore, when communities implement CC programs, they could focus recruitment of new CC members based on following demographic categories: females, older individuals, married couples, residents of single family homes, car owners, and smaller town residents. As a result of this focused

recruitment, communities with CC programs would see levels of CC participation increase.

6.2.1.2. Significant Demographic Factors Contributing to CC Activities

Three statistically significant demographic factors contributed to CC activities. First, marital status increased the likelihood that individuals would fill their daily needs through CC. For example, among CC users, single individuals were more likely to frequently exchange goods and services with CC each month. Second, CC worked more efficiently for people living in cities with higher poverty rates. In areas with higher poverty rates, individuals participated in exchanges more frequently. This finding was consistent with previous studies where most CC systems targeted socially excluded people, such as the poor, disabled, and elderly (Collom, 2007; Collom, 2008; Lasker et al., 2011; Letcher & Perlow, 2009). Third, an unexpected finding from the present study indicated that people who commuted by driving alone were more likely to complete exchanges more frequently and have more trading partners. A possible explanation might be that people commuting by driving alone might have little interaction with other people in their own neighborhoods. As a consequence, these commuters may obtain goods and services through CC systems elsewhere rather than in their own neighborhoods, when compared to individuals who commuted by other means. This counterintuitive result calls for further research with a larger sample.

6.2.2. CC as an Important Tool for Improving Residents' Community Attachment and Quality of Life

The current research sought to understand the role of CC activities and CC satisfaction on community attachment (PH2)[56] and QOL (PH3).[57] Specifically in the present study, community attachment factors were broken down into *neighborhood cohesion, community support,* and *local shopping loyalty.* Also, QOL was subdivided into five factors: *physical and material well-being, relations with other people, social/community/civic activities, personal development and fulfillment,* and *recreation.*

6.2.2.1. Community Attachment

Interestingly, CC members who provided services and received more time credits had higher levels of *neighborhood cohesion,* and *local shopping loyalty.* Conversely, CC members who obtained more services and used more time credits had lower levels of *community support* and *local shopping loyalty.* Further, when CC members used more time credits for services 'available' on the market, their levels on all three community attachment factors (*neighborhood cohesion, community support,* and *local shopping loyalty*) decreased after controlling for demographic factors. In contrast, CC members who obtained services 'not available' on the market had higher levels of *community support.* The correlation between services' availability or unavailability on the market and community attachment are findings unique to the

[56] Primary hypothesis 2: Among CC users, more frequent CC activities will increase their level of community attachment.
[57] Primary hypothesis 3: Among CC users, more frequent CC activities will enhance their quality of life.

current study. Thus, based on these findings, when CC systems provide more services that are 'unavailable' on the market, CC members' *community support* and *local shopping loyalty* levels would increase.

Moreover, when CC members were socially satisfied with CC, they showed higher levels of *neighborhood cohesion* and *local shopping loyalty. Social satisfaction with CC* correlated with members' social capital, specifically increased social networks, self-confidence, trust, and life satisfaction. Previous studies support these results; CC increases social capital, promotes community cohesion, and stimulates communities' economic regeneration (Pacione, 2011; Slay, 2011; Soder, 2008).

6.2.2.2. Quality of Life

Jacob, Jovic, and Wheatley (2004) found that CC generally improved members' QOL by building trust and extending social and economic relationships. The authors (Jacob, Jovic, and Wheatley, 2004) calculated QOL as a unidimensional construct. Conversely, the present study calculated QOL as a multidimensional construct – *physical and material well-being, relations with other people, social/community/civic activities, personal development and fulfillment,* and *recreation.* After controlling for demographic factors, when CC members were more socially satisfied with CC, they demonstrated higher levels of QOL related to *physical and material well-being, social/community/civic activities* and *personal development and fulfillment*. Further, members who participated longer in CC systems reported higher levels of specific dimensions of QOL: *physical and material well-being, relations with other people,* and

personal development and fulfillment. In brief, for policymakers, findings from the present study confirm the importance of CC activities as a catalyst for community well-being by promoting community engagement.

In addition, compared to nonmembers, CC members showed higher levels of community attachment in terms of *community support* and *local shopping loyalty,* as well as QOL related to *relations with other people*, *social/community/civic activities*, and *personal development and fulfillment*. The evidence from the present study suggests that CC organizations provide support for their members in a number of ways for boosting the living standards. In this regard, local public bodies could introduce CC programs in their communities as a novel, inexpensive, and effective way to improve their local economies and social environment. Also, policy makers could use these findings to improve their community members' quality of life and community attachment by employing CC. Despite local government budget constraints due to the recent recession, CC gives local communities the ability to provide social services for the needs of community members.

6.2.3. Positive Impacts of Neighborhood Environments on Community Attachment[58]

As expected, after controlling for neighborhood environments and demographics, CC members were more likely to report higher levels of *community support* and *local shopping loyalt*y, compared to nonmembers. These findings are in line with the aims of the CC program to promote local economies and improve community cohesion (Collom, 2011; Collom et al., 2012; Lasker et al., 2011; Richey, 2007; Slay, 2011). According to Jacobsohn's study (2014), when some Time Banking systems closed due to the lack of resources, such as funding and administration, former members recognized the importance of a sense of community and social capital, and demonstrated a sense of loss. Thus, where possible, former members wanted to re-join the Time Banking programs to help maintain community attachment.

In terms of neighborhood environments, neighborhood safety positively influenced all three community attachment factors – *neighborhood cohesion, community support,* and *local shopping loyalt*y – after controlling for neighborhood environment and demographics. Previous research indicated that perceived safety from crime improved residents' neighborhood satisfaction and increased community attachment (Hur & Morrow-Jones, 2008; Hur & Nasar, 2014). Perceived safety from crime could be enhanced through neighborhood upkeep (Hur & Nasar, 2014). If communities

[58] Secondary hypothesis 1: Among both CC users and nonusers, those living in higher-walkability neighborhoods will show higher levels of community attachment than those living in lower-walkability neighborhoods.

increase their efforts in maintaining their community surroundings (such as cleaning up litter/trash, fixing broken infrastructures, and maintaining buildings and vacant lots well), the levels of residents' community attachment would be increased.

Furthermore, as expected, the present study found that a high level of *place dependence* was associated with higher *neighborhood cohesion, community support,* and *local shopping loyalty*. *Place dependence* explained the residents' neighborhood attachments related to the settings' ability to facilitate desired activities and satisfy residents' needs or goals (G. Kyle, Graefe, & Manning, 2004). Thus, if communities develop their own place-based activities or events, residents' community attachment would be boosted. In addition, the *number of social activity places* (such as restaurants, parks, and shops) contributed positively to *local shopping loyalty*. The more social activity places residents had access to in their neighborhoods, the more local shopping opportunities existed for the residents. This finding implies that if cities provide more social activity places (i.e., third places), the communities would boost their local economy.

6.2.4. Promoting Residents' Quality of Life via Increased Community Attachment[59]

After controlling for CC membership and demographic factors, those with higher levels of *neighborhood cohesion* showed higher degrees of QOL related to *social/community/civic activities, personal development/fulfillment* and *recreation.* This finding confirms the previous research and demonstrates that community attachment is a critical predictor of increased QOL (Helliwell & Putnam, 2004; Leyden et al., 2011; Leyden et al., 2011; L. Newman & Waldron, 2012; R. Putnam, 2000). Moreover, as expected, those reporting higher levels of *community support* showed higher levels of QOL related to *relations with other people* and *social/community/civic activities*. Further, those with higher levels of *local shopping loyalty* presented higher levels of *physical and material well-being*.

After controlling for demographic and community attachment factors, CC members, compared to nonmembers, showed higher QOL related to *relations with other people, social/community/civic activities,* and *personal development and fulfillment.* Results from relationships between CC membership and QOL in the present study were consistent with previous QOL studies in terms of social activities. These findings align with previous research that indicated social/community activities such as volunteering

[59] Secondary hypothesis 2-1: Among both CC users and nonusers, those with a greater level of community attachment will also enjoy a higher quality of life than those with lower levels of community attachment.
Secondary hypothesis 2-2: CC users will enjoy a higher quality of life than nonusers living in neighborhoods with physical environments similar to those of CC users.
Secondary hypothesis 2-3: Higher socioeconomic status will increase the quality of life for both CC users and nonusers living in physical neighborhood environments similar to those of CC users.

and civic participation play a crucial role in improving QOL (R. Putnam, 2000; Van Kamp et al., 2003).

Finally, several demographic factors, such as socioeconomic status, race, and marital status, helped explain the differences in QOL. While previous research used a single dimension of general QOL as a composite score, the present study used five dimensions of QOL. Thus, the findings of the present study showed the relationship between the demographic factors and each of the five QOL factors more thoroughly. Car owners were more satisfied with *personal development and fulfillment,* compared to non-car owners. This may be due to good mobility and greater access to learning or other opportunities. Also, as expected, those who had higher incomes and lived in a single family home showed higher levels of *physical and material well-being*. In terms of race, non-whites showed higher levels on all QOL factors except for *relations with other people*. Contrary to previous studies, married people showed lower levels of *physical and material well-being.* This may be an artifact of the small sample size. A larger sample size would allow researchers to explore this counterintuitive result in more depth. Therefore, further investigation is required to better understand the relationships between socio-economic-demographic factors and segmented QOL factors.

6.3. LIMITATIONS

The present study has several limitations that should be addressed in future work. First, the analysis of causal relationships between study variables was limited by

the cross-sectional design. Future studies could utilize a pre-post case control design to explore differences over time. Second, the present study focused only on one Time Banking system. We suggest that in future studies researchers compare different types of CC systems (e.g., Local Exchange Trading Systems) and/or include larger number of Time Banking systems, which would allow greater control of CC system level variables or neighborhood level variables in multi-level analyses. Further, selecting a more diverse CC system might improve our understanding of the role played by CC members' socioeconomic and demographic factors.

Third, different data collection times and different recruitment methods can create a bias. Data of CC users were collected from March through June, while data of nonusers were collected from July through September. This was because the data of nonusers must be collected in the same cities where CC members lived. Thus, based on the CC users' addresses, the data of nonusers could be selected. Also, the data of CC users were collected through the Crooked River Alliance of TimeBanks (CRAT) system. Data of nonusers were recruited via Mechanical Turk (MTurk), an online survey service. Through MTurk, data of nonusers were collected from participants living in Ohio, and then nonusers living in the same cities as CC users were selected. Due to this different recruitment method, the sample characteristics can be different such as age, gender, and income.

Fourth, a small sample size is another limitation of the present study, which confined the investigator's ability to explain all significant variables and the correlations between the variables. The results of bivariate analyses implied that there may be

additional significant associations among neighborhood environments, CC activities, and demographic factors. Larger samples that apply more advanced statistical methods, such as structural equation modeling, would permit explicitly testing the mediating effect of perceived walkability between objectively measured walkability and factors such as CC activities, community attachment, or QOL. At least one existing study has indicated that perceived walkability mediates the relationship between objectively measured walkability and neighborhood satisfaction related to community attachment (Jun & Hur, 2015).

Fifth, omitted variables, which are unavailable from Walk Score, (related to physical environments or confounding variables), may still exist and might influence CC activities/community attachment/quality of life. The Walk Score is a composite score of several factors (e.g., errands score, culture score, grocery score, park score, dining and drinking score, school score, and shopping score). Thus, the analyses with each amenity factor would further the understanding of the impact of amenity variation (i.e., which amenities affect CC activities or community attachment more). Also, Walk Score did not account for street design (e.g., sidewalk presence or width), safety data (e.g., crime and crash data), pedestrian-friendly community design (e.g., building setbacks, destination clusters, and parking placements), topography (street slopes), or weather (Duncan et al., 2011; Pivo & Fisher, 2011). Future work may address these limitations by collecting data using a true audit or GIS method to better define the quality of amenities or sidewalk density, for example. To address the Walk Score's limitations, the present study used subjectively collected data from the survey (e.g.,

access to services, comforts in walking, crime safety, place dependence, and *social activity places*) where the CC users and nonusers live because the Walk Score does not capture the perceived neighborhood walkability factors (e.g., satisfaction, safety, etc.). Other potential variables that could have effectively been collected or used in the analysis include objectively measured crime rates and traffic volumes, as well as subjectively measured neighborhood upkeep and traffic volumes. These factors could be explored in a future study to elicit results relating to CC activities, community attachment, and QOL.

Finally, the present study used mean or median replacement for missing values, which can increase the chance of Type 1 error (Donders, van der Heijden, Geert JMG, Stijnen, & Moons, 2006; Rubin, 1976; Schafer & Graham, 2002). While this method, by definition, reduces the observed variance, it was necessary to achieve sufficient statistical power given the limited sample size of the present study.

6.4. CONTRIBUTIONS

There have been few studies discussing ways to boost CC membership, even though CC can be employed as an important tool for the community's economic and social sustainability. Both human behavior and community viability are influenced by the physical environment such as neighborhood walkability (B. B. Knudsen & Clark, 2013; Lewicka, 2011; Leyden, 2003; Mehta & Bosson, 2010; Najafi, 2011; Raymond et al., 2010; Wood et al., 2010). In this respect, the present study highlighted the important role of physical environments on ways to encourage the incidence of CC membership

and activities. With the goal of stimulating innovative approaches to promote CC activities, the present study is one of the first investigations to systematically explore the relationships between the neighborhood environment and CC activities.

In methodological aspects of CC research, the present study contributed a more detailed understanding of CC activities. The current study used both objectively (Walk Score) and subjectively measured walkability (survey) to investigate the role of physical environments on CC activities and community attachment factors. This use of two measures resulted in increased accuracy of measurement. Furthermore, unlike previous CC studies that focus on the CC users, the present study used data of both CC users and nonusers. Another contribution of the present study was to measure the actual amount of CC (time credits) used for providing or obtaining goods and services 'available' or 'unavailable' on the market. This work further illustrated the positive relationships among these CC amounts, community attachment factors (*neighborhood cohesion, community support*, and *local shopping loyalty*), and QOL factors (*physical and material well-being*, *relations with other people*, *social/community/civic activities*, *personal development and fulfillment*, and *recreation).* In addition, the present study used multi-dimensional constructs of community attachment and QOL, based on multi-item measures of each attribute, which resulted in a higher level of reliability than a single-item measure. Using multi-dimensional measures allowed for more detailed analyses of the relationships among neighborhood environments, CC activities, community attachment factors, and QOL factors.

In sum, based on the findings of this research, CC organizations can identify ways to increase participation. Also, policy makers, planners, and designers may apply CC as an asset-based development approach to their work and improve their physical neighborhood environments to enhance walkability, which has the potential to increase the social and economic vitality of communities through more sociable neighborhood environments. Physical environment improvement for walkability includes not only well-connected street networks but also soft edges, such as well-maintained parks and sidewalks, which are more amenable to the development of social connectedness among community members.

The results of the present study provide a useful framework through which to test the roles of the neighborhood environment in promoting or preventing participation in energetic social activities among community members. Also, the results of this study illuminate the ways in which various individual, social, and physical environmental factors impacted community engagement. The present study could help local communities to better utilize CC to build supportive environments for socially active living for community members, particularly those that are disadvantaged in society.

REFERENCES

Acock, A. C. (2008). *A gentle introduction to STATA* Stata press.

Adler, P. S., & Kwon, S. (2002). Social capital: Prospects for a new concept. *Academy of Management Review, 27*(1), 17-40.

Aldrich, D. P., & Meyer, M. A. (2014). Social capital and community resilience. *American Behavioral Scientist, ,* 0002764214550299.

Amick, D. J., & Kviz, F. J. (1975). Social alienation in public housing: The effects of density and building types. *Ekistics, ,* 118-120.

Appleyard, D. (1976). *Planning a pluralist city: Conflicting realities in Ciudad Guayana* MIT Press Cambridge, MA.

Arrow, K. J. (1972). Gifts and exchanges. *Philosophy & Public Affairs, ,* 343-362.

Australian Red Cross. (2012). *Relationships matter, the application of social capital to disaster resilience: National disaster resilience roundtable report.* (). Melbourne, Australia: Australian Red Cross.

Badland, H.M., Schofield, G.M., Witten, K., Schluter, P.J., Mavoa, S., Kearns, R.A., Hinckson, E.A., Oliver, M., Kaiwai, H., Jensen, V.G. & Ergler, C., 2009. Understanding the Relationship between Activity and Neighbourhoods (URBAN)

Study: research design and methodology. *BMC Public Health, 9*, 224-2458-9-224. doi:10.1186/1471-2458-9-224 [doi]

Baker, W. E., & Levine, S. S. (2010). Mechanisms of generalized exchange: Towards an integrated model. *Available at SSRN 1352101*,

Ballas, D. (2013). What makes a 'happy city'? *Cities, 32*, S39-S50.

Ballas, D., & Dorling, D. (2007). Measuring the impact of major life events upon happiness. *International Journal of Epidemiology*, *36*(6), 1244-1252. doi:dym182 [pii]

Baum, F., & Palmer, C. (2002). 'Opportunity structures': Urban landscape, social capital and health promotion in australia. *Health Promotion International, 17*(4), 351-361.

Bellotti, V. M., Cambridge, S., Hoy, K., Shih, P. C., Handalian, L. R., Han, K., & Carroll, J. M. (2014). Towards community-centered support for peer-to-peer service exchange: Rethinking the timebanking metaphor. Paper presented at the *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 2975-2984.

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*(2), 238.

Bergami, M., & Bagozzi, R. P. (2000). Self- categorization, affective commitment and group self- esteem as distinct aspects of social identity in the organization. *British Journal of Social Psychology*, *39*(4), 555-577.

Berinsky, A. J., Huber, G. A., & Lenz, G. S. (2012). Evaluating online labor markets for experimental research: Amazon. com's Mechanical Turk. *Political Analysis*, *20*(3), 351-368.

BerkShares, I. (2016a). Using BerkShares; how it works. Retrieved from http://www.berkshares.org/how_to_spend

BerkShares, I. (2016b). What are berkshares? Retrieved from http://www.berkshares.org/what_are_berkshares

Berry, B. J., & Okulicz-Kozaryn, A. (2011). An urban-rural happiness gradient. *Urban Geography*, *32*(6), 871-883.

Bourdieu, P. (1986). The forms of capital. *Handbook of Theory and Research for the Sociology of Education*, *241*, 258.

Bowling, A. (2011). Do older and younger people differ in their reported well-being? A national survey of adults in Britain. *Family Practice*, *28*(2), 145-155. doi:10.1093/fampra/cmq082 [doi]

Boyce, C. (2010). Walkability, social inclusion and social isolation and street redesign. *Built Environment*, *36*(4), 461-473.

Brehm, J. M., Eisenhauer, B. W., & Krannich, R. S. (2004). Dimensions of community attachment and their relationship to Well- Being in the Amenity- Rich rural west*. *Rural Sociology, 69*(3), 405-429.

Brownson, R. C., Hoehner, C. M., Day, K., Forsyth, A., & Sallis, J. F. (2009). Measuring the built environment for physical activity: State of the science. *American Journal of Preventive Medicine, 36*(4), S99-S123. e12.

Brzoska, P., & Razum, O. (2010). *Validity issues in quantitative migrant health research: The example of illness perceptions* Peter Lang.

Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk a new source of inexpensive, yet high-quality, data? *Perspectives on Psychological Science, 6*(1), 3-5.

Cahn, E. (2006). *Time banking*. Washington, DC: TimeBanksUSA.

Carr, L J Carr, S I Dunsiger, B H Marcus. (2011). Validation of walk score for estimating access to walkable amenities. *British Journal of Sports Medicine, 45*(14), 1144-1148. doi:10.1136/bjsm.2009.069609

Casler, K., Bickel, L., & Hackett, E. (2013). Separate but equal? A comparison of participants and data gathered via Amazon's MTurk, social media, and face-to-face behavioral testing. *Computers in Human Behavior, 29*(6), 2156-2160.

Cattell, V. (2001). Poor people, poor places, and poor health: The mediating role of social networks and social capital. *Social Science & Medicine, 52*(10), 1501-1516.

Cerin, E., Saelens, B. E., Sallis, J. F., & Frank, L. D. (2006). Neighborhood environment walkability scale: Validity and development of a short form. *Medicine and Science in Sports and Exercise, 38*(9), 1682.

Chiu, M., Shah, B. R., Maclagan, L. C., Rezai, M., Austin, P. C., & Tu, J. V. (2015). Walk score® and the prevalence of utilitarian walking and obesity among Ontario adults: A cross-sectional study. *Health Reports, 26*(7), 3.

Clark, A. E. (2003). Unemployment as a social norm: Psychological evidence from panel data. *Journal of Labor Economics, 21*(2), 323-351.

Clark, A. E., & Oswald, A. J. (1994). Unhappiness and unemployment. *The Economic Journal, 104*(424), 648-659.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2013). *Applied multiple regression/correlation analysis for the behavioral sciences* Routledge.

Colantonio, A., & Dixon, T. (2011). *Urban regeneration and social sustainability: Best practice from European cities* John Wiley & Sons.

Coleman, J. (1993). S. Foundations of social theory. *Cambridge, Mass.: Belknap Press.Deutsch, 3*, 1991-1993.

Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, , S95-S120.

Collom, E. (2005). Community currency in the United States: The social environments in which it emerges and survives. *Environment and Planning A, 37*(9), 1565-1587.

Collom, E. (2007). The motivations, engagement, satisfaction, outcomes, and demographics of time bank participants: Survey findings from a US system. *International Journal of Community Currency Research, 11*, 36-83.

Collom, E. (2008). Engagement of the elderly in time banking: The potential for social capital generation in an aging society. *Journal of Aging & Social Policy, 20*(4), 414-436.

Collom, E. (2011). Motivations and differential participation in a community currency system: The dynamics within a local social movement Organization1. Paper presented at the *Sociological Forum*, , *26*(1) 144-168.

Collom, E., Lasker, J. N., & Kyriacou, C. (2012). Equal time, equal value.

Community Currency Knowledge Gateway. (2016). Quick guides for policy makers. Retrieved from http://community-currency.info/en/quick-guides/policy-makers/#introduction

Cook, K. S., Cheshire, C., Rice, E. R., & Nakagawa, S. (2013). Social exchange theory. *Handbook of social psychology* (pp. 61-88) Springer.

Cook, K. S., & Rice, E. (2003). Social exchange theory.‖ pp. 53-76 in handbook of social psychology, edited by J. Delamater.

Cook, K. S. (2005). Networks, norms, and trust: The social psychology of social capital∗ 2004 cooley mead award address. *Social Psychology Quarterly, 68*(1), 4-14.

Cooper, A. C., Gimeno-Gascon, F. J., & Woo, C. Y. (1994). Initial human and financial capital as predictors of new venture performance. *Journal of Business Venturing, 9*(5), 371-395.

Cooper, C. H., Fone, D. L., & Chiaradia, A. J. (2014). Measuring the impact of spatial network layout on community social cohesion: A cross-sectional study. *International Journal of Health Geographics*, *13*(1), 1.

Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology, 78*(1), 98.

Cross, J. E. (2003). Conceptualizing community attachment. Paper presented at the *Proceedings of the Rural Sociological Society Annual Meeting. Montreal: Rural Sociological Society,*

Cunningham, G., & Mathie, A. (2002). Asset-based community development: An overview. *Coady International Institute.Retrieved February, 4*, 2009.

Della Peruta, M., & Torre, D. (2015). Virtual social currencies for unemployed people. *International Journal of Community Currency Research, 19*(D), 31-41.

Desa, G. (2012). Resource mobilization in international social entrepreneurship: Bricolage as a mechanism of institutional transformation. *Entrepreneurship Theory and Practice, 36*(4), 727-751.

Donders, A. R. T., van der Heijden, Geert JMG, Stijnen, T., & Moons, K. G. (2006). Review: A gentle introduction to imputation of missing values. *Journal of Clinical Epidemiology, 59*(10), 1087-1091.

Du Toit, L., Cerin, E., Leslie, E., & Owen, N. (2007). Does walking in the neighbourhood enhance local sociability? *Urban Studies, 44*(9), 1677-1695.

Duncan, D. T., Aldstadt, J., Whalen, J., Melly, S. J., & Gortmaker, S. L. (2011). Validation of walk score® for estimating neighborhood walkability: An analysis of four US metropolitan areas. *International Journal of Environmental Research and Public Health, 8*(11), 4160-4179.

Eleni, T., George, T., & Dimitris, K. (2013). *Local exchange trading systems (LETS) as a response to economic crisis: The case of Greece.* ().The United Nations Non-Governmental Liaison Service.

Elgar, F. J., Davis, C. G., Wohl, M. J., Trites, S. J., Zelenski, J. M., & Martin, M. S. (2011). Social capital, health and life satisfaction in 50 countries. *Health & Place, 17*(5), 1044-1053.

Emerson, R. M. (1976). Social exchange theory. *Annual Review of Sociology, 2*, 335-362.

FEMA. (2011). *A whole community approach to emergency management: Principles, themes, and pathways for action*. Washington, DC: Federal Emergency Management Agency.

Flanagan, J. C. (1982). Measurement of quality of life: Current state of the art. *Archives of Physical Medicine and Rehabilitation, 63*(2), 56-59.

Fleming, R., Baum, A., & Singer, J. E. (1985). Social support and the physical environment.

Florida, R. (2010). *Who's your city?: How the creative economy is making where to live the most important decision of your life* Vintage Canada.

Fone, D. L., Farewell, D. M., & Dunstan, F. D. (2006). An ecometric analysis of neighbourhood cohesion. *Population Health Metrics, 4*(1), 1.

Forno, F., & Graziano, P. R. (2014). Sustainable community movement organisations. *Journal of Consumer Culture, ,* 1469540514526225.

Foster, C., Hillsdon, M., & Thorogood, M. (2004). Environmental perceptions and walking in English adults. *Journal of Epidemiology and Community Health, 58*(11), 924-928. doi:58/11/924 [pii]

Fukuyama, F. (1995). *Trust: The social virtues and the creation of prosperity* JSTOR.

Glaeser, E. L., Laibson, D., & Sacerdote, B. (2002). An economic approach to social capital*. *The Economic Journal, 112*(483), F437-F458.

Glaeser, E. L., & Redlick, C. (2009). Social capital and urban growth. *International Regional Science Review, 32*(3), 264-299.

Gomez, G. M., & Helmsing, A. (2008). Selective spatial closure and local economic development: What do we learn from the argentine local currency systems? *World Development, 36*(11), 2489-2511.

Goodman, J. K., Cryder, C. E., & Cheema, A. (2013). Data collection in a flat world: The strengths and weaknesses of Mechanical Turk samples. *Journal of Behavioral Decision Making, 26*(3), 213-224.

Greco, T. H. (2002). Understanding and creating alternatives to legal tender.

Handy, S. L., Boarnet, M. G., Ewing, R., & Killingsworth, R. E. (2002). How the built environment affects physical activity: Views from urban planning. *American Journal of Preventive Medicine, 23*(2), 64-73.

Hanifan, L. J. (1916). The rural school community center. *Annals of the American Academy of Political and Social Science, 67*, 130-138.

Hanna, K. S., Dale, A., & Ling, C. (2009). Social capital and quality of place: Reflections on growth and change in a small town. *Local Environment, 14*(1), 31-44.

Haslam, S. A., Jetten, J., Postmes, T., & Haslam, C. (2009). Social identity, health and well-being: An emerging agenda for applied psychology. *Applied Psychology, 58*(1), 1-23.

Haynes, P. J. (2009). Before going any further with social capital: Eight key criticisms to adress.

Helliwell, J. F., & Putnam, R. D. (2004). The social context of well-being. *Philosophical Transactions-Royal Society of London Series B Biological Sciences,* , 1435-1446.

Holden, C. J., Dennie, T., & Hicks, A. D. (2013). Assessing the reliability of the M5-120 on Amazon's Mechanical Turk. *Computers in Human Behavior, 29*(4), 1749-1754.

Holder, M. D., & Coleman, B. (2009). The contribution of social relationships to children's happiness. *Journal of Happiness Studies, 10*(3), 329-349.

Homans, G. C. (1958). Social behavior as exchange. *American Journal of Sociology*, , 597-606.

Homans, G. C. (1974). Social behavior: Its elementary forms.(revised ed.).

Hozier, G. C., & Stem, D. E. (1985). General retail patronage loyalty as a determinant of consumer outshopping behavior. *Journal of the Academy of Marketing Science, 13*(1-2), 32-46.

Hur, M., & Morrow-Jones, H. (2008). Factors that influence residents' satisfaction with neighborhoods. *Environment and Behavior,*

Hur, M., & Nasar, J. L. (2014). Physical upkeep, perceived upkeep, fear of crime and neighborhood satisfaction. *Journal of Environmental Psychology, 38*, 186-194.

Hur, M., Nasar, J. L., & Chun, B. (2010). Neighborhood satisfaction, physical and perceived naturalness and openness. *Journal of Environmental Psychology*, *30*(1), 52-59.

Ithaca HOURS. (2016). Creating community economics with local currency. Retrieved from http://www.ithacahours.com/

Jacob, J., Brinkerhoff, M., Jovic, E., & Wheatley, G. (2004). The social and cultural capital of community currency: An Ithaca HOURS case study survey. *International Journal of Community Currency Research, 8*, 42-56.

Jacobs, J. (1961). *The death and life of great American cities* Random House Digital, Inc.

Jacobsohn, S. A. (2014). *Stories of Money: Building Social Capital through Time Banking,*

Jeffres, L. W., Bracken, C. C., Jian, G., & Casey, M. F. (2009). The impact of third places on community quality of life. *Applied Research in Quality of Life, 4*(4), 333-345.

Jun, H., & Hur, M. (2015). The relationship between walkability and neighborhood social environment: The importance of physical and perceived walkability. *Applied Geography, 62*, 115-124.

Kaczynski, A. T., & Glover, T. D. (2012). Talking the talk, walking the walk: Examining the effect of neighbourhood walkability and social connectedness on physical activity. *Journal of Public Health (Oxford, England), 34*(3), 382-389. doi:10.1093/pubmed/fds011 [doi]

Kent, T. (1997). *In pursuit of the public good: Essays in honour of Allan J. MacEachen* McGill-Queen's Press-MQUP.

Kim, J. (2007). Perceiving and valuing sense of community in a new urbanist development: A case study of Kentlands. *Journal of Urban Design, 12*(2), 203-230.

Knudsen, B. B., & Clark, T. N. (2013). Walk and be moved: How walking builds social movements. *Urban Affairs Review,*

Knudsen, B., Florida, R., Stolarick, K., & Gates, G. (2008). Density and creativity in US regions. *Annals of the Association of American Geographers, 98*(2), 461-478.

Kweon, B., Ellis, C. D., Lee, S., & Rogers, G. O. (2006). Large-scale environmental knowledge investigating the relationship between self-reported and objectively measured physical environments. *Environment and Behavior, 38*(1), 72-91.

Kwon, S., & Adler, P. S. (2014). Social capital: Maturation of a field of research. *Academy of Management Review, 39*(4), 412-422.

Kyle, G. T., Theodori, G. L., Absher, J. D., & Jun, J. (2010). The influence of home and community attachment on firewise behavior. *Society and Natural Resources, 23*(11), 1075-1092.

Kyle, G., Graefe, A., & Manning, R. (2004). Attached recreationists... who are they. *Journal of Park and Recreation Administration, 22*(2), 65-84.

Larsen, L., Harlan, S.L., Bolin, B., Hackett, E.J., Hope, D., Kirby, A., Nelson, A., Rex, T.R. & Wolf, S. (2004). Bonding and bridging understanding the relationship between social capital and civic action. *Journal of Planning Education and Research, 24*(1), 64-77.

Lasker, J., Collom, E., Bealer, T., Niclaus, E., Keefe, J.Y., Kratzer, Z., Baldasari, L., Kramer, E., Mandeville, R., Schulman, J. & Suchow, D. (2011). Time banking and health: The role of a community currency organization in enhancing well-being. *Health Promotion Practice, 12*(1), 102-115.

Lawler, E. J. (2001). An affect theory of social Exchange1. *American Journal of Sociology, 107*(2), 321-352.

Layard, P. R., & Layard, R. (2011). *Happiness: Lessons from a new science* Penguin UK.

Lee, C., & Moudon, A. V. (2006a). The 3Ds R: Quantifying land use and urban form correlates of walking. *Transportation Research Part D: Transport and Environment, 11*(3), 204-215.

Lee, C., & Moudon, A. V. (2006b). Correlates of walking for transportation or recreation purposes. *Journal of Physical Activity & Health, 3*

Lee, C., Moudon, A. V., & Courbois, J. P. (2006). Built environment and behavior: Spatial sampling using parcel data. *Annals of Epidemiology, 16*(5), 387-394.

Lee, C., Kang, S. K., Long, P., & Reisinger, Y. (2010). Residents' perceptions of casino impacts: A comparative study. *Tourism Management, 31*(2), 189-201.

Lee, J. H. (2015). *Older adults' third places and perceived social connectedness* (Doctoral dissertation, Texas A & M University).

Letcher, A. S., & Perlow, K. M. (2009). Community-based participatory research shows how a community initiative creates networks to improve well-being. *American Journal of Preventive Medicine, 37*(6), S292-S299.

Levasseur, M., Tribble, D. S., & Desrosiers, J. (2009). Meaning of quality of life for older adults: Importance of human functioning components. *Archives of Gerontology and Geriatrics, 49*(2), e91-e100.

Levine, J. (1999). Access to choice. *ACCESS Magazine, 1*(14)

Levine, J. (2002). *Land use and Transportation Alternatives: Constraint Or Expansion of Household Choice?.,*

Lewicka, M. (2011). Place attachment: How far have we come in the last 40 years? *Journal of Environmental Psychology, 31*(3), 207-230.

Leyden, K. M., Goldberg, A., & Duval, R. D. (2011). The built environment, maintenance of the public sphere and connections to others and to place: An examination of 10 international cities. *Journal of Urbanism, 4*(1), 25-38.

Leyden, K. M., Goldberg, A., & Michelbach, P. (2011). Understanding the pursuit of happiness in ten major cities. *Urban Affairs Review, 47*(6), 861-888.

Leyden, K. M. (2003). Social capital and the built environment: The importance of walkable neighborhoods. *American Journal of Public Health, 93*(9), 1546-1551.

Lin, X., & Kede, Q. (2011). Embeddedness, social network theory and social capital theory: Antecedents and consequence. Paper presented at the *Management and Service Science (MASS), 2011 International Conference On*, 1-5.

Linton, M., & Soutar, A. (1994). The LETSystem design manual. *Courtenay, CA: Landsman Community*,

Litman, L., Robinson, J., & Rosenzweig, C. (2014). The relationship between motivation, monetary compensation, and data quality among US-and india-based workers on Mechanical Turk. *Behavior Research Methods*, *47*(2), 519-528.

Longhurst, N., & Seyfang, G. (2011). Harnessing grassroots innovations: Complementary currencies and sustainability. *International Event on Community and Complementary Currencies, Lyon*,

Lund, H. (2002). Pedestrian environments and sense of community. *Journal of Planning Education and Research*, *21*(3), 301-312.

Lund, H. (2003). Testing the claims of new urbanism: Local access, pedestrian travel, and neighboring behaviors. *Journal of the American Planning Association*, *69*(4), 414-429.

Lyubomirsky, S., Sheldon, K. M., & Schkade, D. (2005). Pursuing happiness: The architecture of sustainable change. *Review of General Psychology*, *9*(2), 111.

Marks, M. B. (2012). Time banking service exchange systems: A review of the research and policy and practice implications in support of youth in transition. *Children and Youth Services Review, 34*(7), 1230-1236.

Marmot, M. (2003). The social determinants of health: The solid facts.

Martikainen, L. (2009). The many faces of life satisfaction among Finnish young adults'. *Journal of Happiness Studies, 10*(6), 721-737.

Mashima, R., & Takahashi, N. (2008). The emergence of generalized exchange by indirect reciprocity. *New issues and paradigms in research on social dilemmas* (pp. 159-176) Springer.

Mason, S. G. (2010). Can community design build trust? A comparative study of design factors in boise, idaho neighborhoods. *Cities, 27*(6), 456-465.

Massam, B. H. (2002). Quality of life: Public planning and private living. *Progress in Planning, 58*(3), 141-227.

Mastekaasa, A., & Moum, T. (1984). The perceived quality of life in Norway: Regional variations and contextual effects. *Social Indicators Research, 14*(4), 385-419.

Matarrita-Cascante, D., Stedman, R., & Luloff, A. (2010). Permanent and seasonal residents' community attachment in natural amenity-rich areas exploring the contribution of landscape-related factors. *Environment and Behavior, 42*(2), 197-220.

Mathie, A., & Cunningham, G. (2003). From clients to citizens: Asset-based community development as a strategy for community-driven development. *Development in Practice, 13*(5), 474-486.

Mathie, A., & Cunningham, G. (2005). Who is driving development? Reflections on the transformative potential of asset-based community development. *Canadian Journal of Development Studies/Revue Canadienne D'Études Du Développement, 26*(1), 175-186.

McGillivray, M. (2007). *Human well-being: Concept and measurement* Palgrave Macmillan.

McGillivray, M., & Clarke, M. (2006). Human well-being: Concepts and measures. *Understanding Human Well-Being, ,* 3-15.

Mehta, V., & Bosson, J. K. (2010). Third places and the social life of streets. *Environment and Behavior, 42*(6), 779-805.

Michelson, W. (1976). *Man and his urban environment: A sociological approach* Addison-Wesley Reading, MA.

Miller, E. J. (2008). Both borrowers and lenders: Time banks and the aged in japan.

Minton, E., Gurel-Atay, E., Kahle, L., & Ring, K. (2013). Comparing data collection alternatives: Amazon mturk, college students, and secondary data analysis. Paper presented at the *Ama Winter Educators' Conference Proceedings, , 24*

Molm, L. D. (2003). Theoretical comparisons of forms of exchange. *Sociological Theory, 21*(1), 1-17.

Molm, L. D. (2008). The structure of reciprocity and integrative bonds: The role of emotions. *Social Structure and Emotion, ,* 167e192.

Molm, L. D. (2010). The structure of reciprocity. *Social Psychology Quarterly, 73*(2), 119-131.

Molm, L. D., Collett, J. L., & Schaefer, D. R. (2007). Building solidarity through generalized exchange: A theory of Reciprocity1. *American Journal of Sociology, 113*(1), 205-242.

Molm, L. D., & Cook, K. S. (1995). Social exchange and exchange networks. *Sociological Perspectives on Social Psychology, 2*, 209-235.

Molm, L. D., Schaefer, D. R., & Collett, J. L. (2007). The value of reciprocity. *Social Psychology Quarterly, 70*(2), 199-217.

Moudon, A., Lee, C., Cheadle, A., Collier, C., Johnson, D., Schmid, T., & Weather, B. (2006). Operational definition of walkable neighborhood: Empirical and theoretical insights. . *Journal of Physical Activity and Health, 3*(1), S77-S98.

Myers, D. G., & Diener, E. (1995). Who is happy? *Psychological Science, 6*(1), 10-19.

Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review, 23*(2), 242-266.

Najafi, M. (2011). The concept of place and sense of place in architectural studies. *World Academy of Science, Engineering & Technology, 80,* 1100-1106.

Nakazato, H., & Hiramoto, T. (2012). An empirical study of the social effects of community currencies. *International Journal of Community Currency Research, 16*, 124-135.

Nasar, J. L., & Julian, D. A. (1995). The psychological sense of community in the neighborhood. *Journal of the American Planning Association, 61*(2), 178-184.

Newman, L., & Waldron, L. (2012). Towards walkable urban neighbourhoods.

Newman, S. J., & Duncan, G. J. (1979). Residential problems, dissatisfaction, and mobility. *Journal of the American Planning Association, 45*(2), 154-166.

North, P. (2014). Ten square miles surrounded by reality? Materialising alternative economies using local currencies. *Antipode, 46*(1), 246-265.

North, P., & Unit, L. E. P. (2000). Complementary currencies and community economic development in international perspective: Problems and how they might be overcome. Paper presented at the *International Network of Engineers and Scientists for Global Responsibility Conference, Stockholm, Sweden,*

Nunnally, J. (1978). Psychometric theory.

Oldenburg, R. (1989). *The great good place: Café, coffee shops, community centers, beauty parlors, general stores, bars, hangouts, and how they get you through the day* Paragon House Publishers.

Olvera, N., Smith, D. W., Lee, C., Liu, J., Lee, J., Kellam, S., & Kim, J. (2012). Hispanic maternal and children's perceptions of neighborhood safety related to walking and cycling. *Health & Place, 18*(1), 71-75.

Pacione, M. (2011). Local money-a response to the globalisation of capital? *Quaestiones Geographicae, 30*(4), 9-19.

Paolacci, G., & Chandler, J. (2014). Inside the Turk understanding Mechanical Turk as a participant pool. *Current Directions in Psychological Science, 23*(3), 184-188.

Paolacci, G., Chandler, J., & Ipeirotis, P. G. (2010). Running experiments on Amazon Mechanical Turk. *Judgment and Decision Making, 5*(5), 411-419.

Patrick, G. (1915). Cities in evolution.

Peterson, N. A., Speer, P. W., & McMillan, D. W. (2008). Validation of a brief sense of community scale: Confirmation of the principal theory of sense of community. *Journal of Community Psychology, 36*(1), 61-73.

Pivo, G., & Fisher, J. D. (2011). The walkability premium in commercial real estate investments. *Real Estate Economics, 39*(2), 185-219.

Portes, A. (2000). Social capital: Its origins and applications in modern sociology. *LESSER, Eric L.Knowledge and Social Capital.Boston: Butterworth-Heinemann, ,* 43-67.

Primavera, H. (2010). Social currencies and solidarity economy: An enduring bond of common good. *WorkingUSA, 13*(1), 41-59.

Putnam, R. (2000). Bowling alone, the collapse and revival of civic America. *New York,*

Putnam, R. D. (1995). Bowling alone: America's declining social capital. *Journal of Democracy, 6*(1), 65-78.

Raymond, C. M., Brown, G., & Weber, D. (2010). The measurement of place attachment: Personal, community, and environmental connections. *Journal of Environmental Psychology, 30*(4), 422-434.

Richard, L., Gauvin, L., Gosselin, C., & Laforest, S. (2009). Staying connected: Neighbourhood correlates of social participation among older adults living in an urban environment in Montreal, Quebec. *Health Promotion International, 24*(1), 46-57. doi:10.1093/heapro/dan039 [doi]

Richey, S. (2007). Manufacturing trust: Community currencies and the creation of social capital. *Political Behavior, 29*(1), 69-88.

Riger, S., LeBailly, R. K., & Gordon, M. T. (1981). Community ties and urbanites' fear of crime: An ecological investigation. *American Journal of Community Psychology, 9*(6), 653-665.

Ring, P. S. (1996). Fragile and resilient trust and their roles in economic exchange. *Business & Society, 35*(2), 148-175.

Rogers, S. H., Gardner, K. H., & Carlson, C. H. (2013). Social capital and walkability as social aspects of sustainability. *Sustainability, 5*(8), 3473-3483.

Rogers, S. H., Halstead, J. M., Gardner, K. H., & Carlson, C. H. (2011). Examining walkability and social capital as indicators of quality of life at the municipal and neighborhood scales. *Applied Research in Quality of Life, 6*(2), 201-213.

Rose, N. (2000). Community, citizenship, and the third way. *American Behavioral Scientist, 43*(9), 1395-1411.

Rosenbaum, M. S., Ward, J., Walker, B. A., & Ostrom, A. L. (2007). A cup of coffee with a dash of love an investigation of commercial social support and third-place attachment. *Journal of Service Research, 10*(1), 43-59.

Rothenbuhler, E. W., Mullen, L. J., DeLaurell, R., & Ryu, C. R. (1996). Communication, community attachment, and involvement. *Journalism & Mass Communication Quarterly, 73*(2), 445-466.

Routledge, P. (2003). Convergence space: Process geographies of grassroots globalization networks. *Transactions of the Institute of British Geographers, 28*(3), 333-349.

Rubin, D. B. (1976). Inference and missing data. *Biometrika, 63*(3), 581-592.

Sander, T. H. (2002). Social capital and new urbanism: Leading a civic horse to water? *National Civic Review, 91*(3), 213-234.

Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods, 7*(2), 147.

Seyfang, G. (2000). The euro, the pound and the shell in our pockets: Rationales for complementary currencies in a global economy. *New Political Economy, 5*(2), 227-246.

Seyfang, G. (2001). Community currencies: Small change for a green economy. *Environment and Planning A, 33*(6), 975-996.

Seyfang, G. (2002). Tackling social exclusion with community currencies: Learning from LETS to time banks. *International Journal of Community Currency Research, 6*(1), 1-11.

Seyfang, G., & Longhurst, N. (2013). Growing green money? Mapping community currencies for sustainable development. *Ecological Economics, 86*, 65-77.

Slay, J. (2011). More than money. *NESTA, London,*

Soder, N. (2008). *Community Currency: An Approach to Economic Sustainability in our Local Bioregion,*

Steed, S., & Bindewald, L. (2015). *Money with a purpose.* (). U.K.: New Economics Foundation.

Steiger, J. H., & Lind, J. C. (1980). Statistically based tests for the number of common factors. Paper presented at the *Annual Meeting of the Psychometric Society, Iowa City, IA, , 758*

Stets, J. E., & Burke, P. J. (2000). Identity theory and social identity theory. *Social Psychology Quarterly,* , 224-237.

Takahashi, N. (2000). The emergence of generalized exchange. *American Journal of Sociology,* , 1105-1134.

Talen, E. (1999). Sense of community and neighbourhood form: An assessment of the social doctrine of new urbanism. *Urban Studies, 36*(8), 1361-1379.

The World Bank. (1999). What is social capital? Retrieved from http://go.worldbank.org/K4LUMW43B0

Theodori, G. L. (2000). Levels of analysis and conceptual clarification in community attachment and satisfaction research: Connections to community development. *Community Development, 31*(1), 35-58.

Theodori, G. L. (2004). Community attachment, satisfaction, and action. *Community Development, 35*(2), 73-86.

TimeBanks USA. (2016). Directory of TimeBanks. Retrieved from http://community.timebanks.org/

Tuckel, P., & Milczarski, W. (2015). Walk ScoreTM, perceived neighborhood walkability, and walking in the US. *American Journal of Health Behavior, 39*(2), 242-256.

Tucker, L. R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. *Psychometrika, 38*(1), 1-10.

Van Kamp, I., Leidelmeijer, K., Marsman, G., & De Hollander, A. (2003). Urban environmental quality and human well-being: Towards a conceptual framework and demarcation of concepts; a literature study. *Landscape and Urban Planning, 65*(1), 5-18.

Vargas-Sánchez, A., Porras-Bueno, N., & de los Ángeles Plaza-Mejía, María. (2013). Residents' attitude to tourism and seasonality. *Journal of Travel Research, ,* 0047287513506295.

Walk Score. (2016). Walk score methodology. Retrieved from https://www.walkscore.com/methodology.shtml

Walker, J. (2009). *Making walking count – 2009 benchmarking, understanding the characteristics, needs and abilities of walkers.* ().

Westlund, H., & Adam, F. (2010). Social capital and economic performance: A meta-analysis of 65 studies. *European Planning Studies, 18*(6), 893-919.

Wheatley, G. (2006). *Complementary Currency and Quality of Life: Social and Economic Capital Effects on Subjective Well-Being,*

Wheatley, G., Younie, C., Alajlan, H., & McFarlane, E. (2011). Calgary dollars: Economic and social capital benefits. *International Journal of Community Currency Research, 15*, 84-89.

Wilkerson, A., Carlson, N. E., Yen, I. H., & Michael, Y. L. (2012). Neighborhood physical features and relationships with neighbors does positive physical environment increase neighborliness? *Environment and Behavior, 44*(5), 595-615.

Williams, D. R., & Vaske, J. J. (2003). The measurement of place attachment: Validity and generalizability of a psychometric approach. *Forest Science, 49*(6), 830-840.

Williams, R. (2008). Ordinal regression models: Problems, solutions, and problems with the solutions. Paper presented at the *German Stata User Group Meetings, June, , 27* 2008.

Willmott, P. (1986). Social networks, informal care and public policy.

Wood, L., Frank, L. D., & Giles-Corti, B. (2010). Sense of community and its relationship with walking and neighborhood design. *Social Science & Medicine, 70*(9), 1381-1390.

Wood, L., & Giles-Corti, B. (2008). Is there a place for social capital in the psychology of health and place? *Journal of Environmental Psychology, 28*(2), 154-163.

Wooldridge, J. M. (2012). *Introductory econometrics: A modern approach* Cengage Learning.

World Bank. (2006). *Where is the wealth of nations?*. Washington D.C: World Bank.

Yancy, W. (1971). Architecture, interaction and social control. *Environment Behav, 3*, 3-21.

Zelizer, V., & Tilly, C. (2006). Relations and categories. *The Psychology of Learning and Motivation, 47*, 1-31.

Zhu, X., Yu, C., Lee, C., Lu, Z., & Mann, G. (2014). A retrospective study on changes in residents' physical activities, social interactions, and neighborhood cohesion after moving to a walkable community. *Preventive Medicine, 69*, S93-S97.

APPENDIX A

A TEST OF RELIABILITY: CC SATISFACTION

A Cronbach's alpha was employed to measure the reliability of the suggested scale. As shown in Table 56 and 57, Cronbach's alpha values for *social and economic satisfaction with CC* were 0.911 and 0.811, respectively. Most of the items showed satisfactory internal consistency for both *social* and *economic satisfaction with CC.*

Table 56

Descriptive Statistics and Reliability Tests of Social Satisfaction with CC

Items	CC Users					
	N	Mean	S.D.	Min	Max	Cronbach's Alpha if item deleted
1. "Community Currency has helped me increase my circle of friends."	77	4.06	1.00	1	5	0.891
2. "Community Currency has helped me develop my self-confidence."	77	3.62	1.10	1	5	0.900
3. "Community Currency has given me the ability to help people."	77	4.26	0.94	1	5	0.905
4. "Community Currency has helped me establish relationships of trust for ongoing or future exchanges of items, goods, and services."	77	4.36	0.86	1	5	0.887
5. "I consciously try to go to the stores or practitioners who accept Community Currency."	76	3.82	1.16	1	5	0.910
6. "After participating in the Community Currency program, I am more willing to stay in the current community than before."	77	4.08	1.10	1	5	0.907
7. "After participating in the Community Currency program, I am more satisfied with my life than before."	77	3.94	0.98	1	5	0.881
Total	77	4.02	0.82	1	5	0.911

* p<.1, ** p<.05, *** p<.01
Measured along a 5-point scale from 1 = strongly disagree to 5 = strongly disagree
A higher score means a higher level of satisfaction with CC.

Table 57

Descriptive Statistics and Reliability Tests of Economic Satisfaction with CC

Items	CC Users					
	N	Mean	S.D.	Min	Max	Cronbach's Alpha if item deleted
1. "Community Currency has helped me to use skills I would not have otherwise used."	77	3.74	1.15	1	5	0.737
2. "Community Currency has given me access to goods and/or services that I would not have otherwise been able to acquire."	77	3.99	1.09	1	5	0.733
3. "Community Currency has given me trading partners for giving my goods and/or services that I otherwise would not have had."	77	4.26	0.97	1	5	0.740
4. "Community Currency has helped me dispose of unneeded or unused items."	77	4.00	1.25	1	5	0.838
Total	77	4.00	0.89	1	5	0.811

* p<.1, ** p<.05, *** p<.01
Measured along a 5-point scale from 1 = strongly disagree to 5 = strongly disagree
A higher score means a higher level of satisfaction with CC.

APPENDIX B

A TEST OF CONSTRUCT VALIDITY AND RELIABILITY: NEIGHBORHOOD ENVIRONMENTS

Perceived Neighborhood Walkability

Access to Services

A factor analysis was used to assess the inherent systematic structure of the scale items. A Cronbach's alpha was employed to measure the reliability of the suggested scale. The initial measurement of *access to services* of both CC users and the full sample, consisting of one 3-item factor, presented that the internal consistency of the measure was acceptable. Cronbach's alpha for the *access to services* measure scores in CC users and the full sample were 0.919 and 0.883, respectively.[60] The results from CFA revealed that the initial measures *of access to services* in CC users and the full sample had good fits to the data (CC users: RMSEA< 0.001, CFI = 1.00, and TLI = 1.00; the full sample: RMSEA< 0.001, CFI = 1.00, and TLI = 1.00).

[60] Cronbach's alpha coefficient values equal to or greater than 0.70 are satisfactory (Nunnally, 1978). Also, 0.60 and above may be acceptable for scales with a reduced number of items (e.g., six or less) (Cortina, 1993).

Table 58

Factor Analysis and Cronbach Alpha test: "Access to Services" of CC users

Variable Symbols	Measured variable	*N*	Mean (*S.D.*)	Factor Loading[a]	Corrected item-total correlation	Cronbach's Alpha if item deleted	Cronbach's Alpha
							0.919
a1	Stores are within easy walking distance of my home.	76	3.09 (1.51)	0.949	0.875	0.850	
a2	There are many places to go within easy walking distance of my home.	75	3.20 (1.50)	0.939	0.854	0.867	
a3	It is easy to walk to a transit stop from my home.	75	3.58 (1.60)	0.897	0.780	0.930	

[a] Extraction Method: Principal Component Analysis[61]

Table 59

Factor Analysis and Cronbach Alpha Test: "Access to Services" of the Full Sample

Variable Symbols	Measured variable	*N*	Mean (*S.D.*)	Factor Loading[a]	Corrected item-total correlation	Cronbach's Alpha if item deleted	Cronbach's Alpha
							0.883
a1	Stores are within easy walking distance of my home.	118	3.41 (1.45)	0.934	0.837	0.775	
a2	There are many places to go within easy walking distance of my home.	117	3.32 (1.45)	0.903	0.772	0.833	
a3	It is easy to walk to a transit stop from my home.	117	3.69 (1.51)	0.864	0.710	0.889	

[a] Extraction Method: Principal Component Analysis

[61] The principal-component factor analysis identifies components that are composites of the items and is generally used in the area of data reduction (Acock, 2008).

Comforts in Walking

The initial measure of *comforts in walking* of both CC users and the full sample, consisting of 6-items, indicated that the internal consistency of the measure was acceptable. Cronbach's alpha for the *comforts in walking* measure scores in CC users and the full sample were 0.758 and 0.761, respectively. Results from CFA revealed that the initial measures of *comforts in walking* in CC users and the full sample had good fits to the data (CC users: RMSEA< 0.001, CFI = 1.00, and TLI = 1.078; the full sample: RMSEA = 0.048, CFI = 0.988, and TLI = 0.980). The results showed that the initial measurement of *comforts in walking* had a reasonable fit to the data. However, two items (f5 and f6) had relatively low reliability (< 0.3),[62] as seen in both CC users and the full sample (Table 60 and 61, respectively), indicating that the items did not contribute to the quality of the measurement. Moreover, factor loadings of those two items on *comforts in walking* presented less than 0.4[63] in both CC users and the full sample.[64] That is, f5 and f6 were irrelevant questions to *comforts in walking*. Also, f5 focuses more on convenience in walking, compared to the other items. Therefore, these two items were removed after the initial measure of *comforts in walking* in order to improve the internal consistency of the measured scales. After that, only four items (f1-f4) were used for further assessments.

[62] Each item should be correlated with the total score in a reliable scale. If items had item-total correlations less than about 0.3, they don't correlate very well with the overall score from the scale (Brzoska & Razum, 2010). Items with low correlations would be deleted.

[63] An item with a loading 0.4 or more on a factor is regarded as a good indicator of that factor (Acock, 2008)

[64] The factor loading of f5 in the full sample indicated the marginal value, 0.409.

Table 60

Factor Analysis and Reliability Test: "Comforts in Walking" of CC Users

Variable Symbols	Measured variable	*N*	Mean (*S.D.*)	Factor Loading[a]	Corrected item-total correlation	Cronbach's Alpha if item deleted	Cronbach's Alpha
							0.758
f1	"There are sidewalks on most of the streets."	77	3.37 (1.56)	0.861	0.710	0.655	
f2	"The sidewalks are well maintained (e.g., paved, even, and not a lot of cracks)."	73	2.88 (1.21)	0.796	0.626	0.691	
f3	"There are enough spaces (e.g., grass strip, trees) between the sidewalks and the vehicular roadways."	75	3.30 (1.43)	0.867	0.708	0.659	
f4	"There are enough benches and other places to rest along the streets."	75	2.15 (1.21)	0.745	0.582	0.703	
f5	"There are enough trees along most of the streets."	75	3.77 (1.27)	**0.384**	**0.247**	**0.786**	
f6	"It is easy to get lost." (a reverse coding item)	75	4.26 (0.94)	**0.197**	**0.136**	**0.795**	

[a] Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Table 61

Factor Analysis and Reliability Test: "Comforts in Walking" of the Full Sample

Variable Symbols	Measured variable	*N*	Mean (*S.D.*)	Factor Loading[a]	Corrected item-total correlation	Cronbach's Alpha if item deleted	Cronbach's Alpha
							0.761
f1	"There are sidewalks on most of the streets."	119	3.51 (1.52)	0.839	0.667	0.676	
f2	"The sidewalks are well maintained (e.g., paved, even, and not a lot of cracks)."	115	2.97 (1.23)	0.821	0.666	0.684	
f3	"There are enough spaces (e.g., grass strip, trees) between the sidewalks and the vehicular roadways."	117	3.43 (1.38)	0.840	0.669	0.677	
f4	"There are enough benches and other places to rest along the streets."	117	2.17 (1.30)	0.757	0.602	0.699	
f5	"There are enough trees along most of the streets."	117	3.76 (1.25)	**0.409**	**0.275**	**0.782**	
f6	"It is easy to get lost." (a reverse coding item)	117	4.17 (0.94)	**0.209**	**0.137**	**0.797**	

[a] Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Crime Safety

The initial measurement of *crime safety* of both CC users and the full sample, consisting of one 3-item factor, revealed that all of the items presented satisfactory internal consistency. Cronbach's alpha for the *crime safety* measure scores in CC users and the full sample were 0.713 and 0.830, respectively. Results from CFA revealed that the initial measures of *crime safety* in CC users and the full sample had good fits to the data (CC users: RMSEA< 0.001, CFI = 1.00, and TLI = 1.00; the full sample: RMSEA< 0.001, CFI = 1.00, and TLI = 1.00).

Table 62

Factor Analysis and Reliability Test: "Crime Safety" of CC Users

Variable Symbols	Measured variable	*N*	Mean (*S.D.*)	Factor Loading[a]	Corrected item-total correlation	Cronbach's Alpha if item deleted	Cronbach's Alpha
							0.713
c1	"There is a high crime rate in my neighborhood." (a reverse coding item)	77	4.37 (0.82)	0.815	.584	0.554	
c2	"The crime rate in my neighborhood makes it unsafe to go on walks during the day." (a reverse coding item)	75	4.87 (0.50)	0.749	.486	0.722	
c3	"The crime rate in my neighborhood makes it unsafe to go on walks at night." (a reverse coding item)	77	4.40 (0.97)	0.856	.634	0.512	

[a] Extraction Method: Principal Component Analysis

Table 63

Factor Analysis and Reliability Test: "Crime Safety" of the Full Sample

Variable Symbols	Measured variable	*N*	Mean (*S.D.*)	Factor Loading[a]	Corrected item-total correlation	Cronbach's Alpha if item deleted	Cronbach's Alpha
							0.830
c1	"There is a high crime rate in my neighborhood." (a reverse coding item)	119	4.23 (1.01)	0.869	0.713	0.739	
c2	"The crime rate in my neighborhood makes it unsafe to go on walks during the day." (a reverse coding item)	117	4.72 (0.71)	0.848	0.671	0.820	
c3	"The crime rate in my neighborhood makes it unsafe to go on walks at night." (a reverse coding item)	119	4.21 (1.15)	0.904	0.766	0.701	

[a] Extraction Method: Principal Component Analysis

Place Dependence

The initial measure of *place dependence* consisted of six items. As shown in table 64 and 65, Cronbach's alpha values for *place dependence* in both CC users and the full sample were 0.812 and 0.829, respectively. The fit indices from CFA indicated the mixed results for the initial measure of *place dependence* in both CC users and the full sample (CC users: RMSEA = 0.103, CFI = 0.974, and TLI = 0.956; the full sample: RMSEA = 0.145, CFI = 0.946, and TLI = 0.040). One item (p6) had relatively low reliability as seen in both CC users and the full sample (Table 64 and 65, respectively), indicating that the item reduced the goodness of fit. Moreover, results from PCA indicated that the item in both CC users and the full sample belonged to the other factor. Therefore, this item was removed from the initial measure of *place dependence* in order to improve the internal consistency of the measured scales.

Table 64

Factor Analysis and Reliability Test: "Place Dependence" of CC Users

Variable Symbols	Measured variable	*N*	Mean (*S.D.*)	Factor Loading[a]	Corrected item-total correlation	Cronbach's Alpha if item deleted	Cronbach's Alpha
							0.812
p1	"My neighborhood is the best place for what I like to do."	77	3.29 (1.29)	0.842	0.710	0.749	
p2	"No other place can compare to my neighborhood."	76	2.87 (1.15)	0.864	0.763	0.741	
p3	"I get more satisfaction out of visiting my neighborhood than any other."	76	2.89 (1.23)	0.885	0.779	0.734	
p4	"Doing what I do at my neighborhood is more important to me than doing it in any other place."	77	2.99 (1.24)	0.902	0.810	0.726	
p5	"I wouldn't substitute any other area for doing the types of things I do at my neighborhood."	77	2.60 (1.19)	0.849	0.742	0.744	
p6	"The things I do at my neighborhood I would enjoy doing just as much at a similar site." (a reverse coding item)	77	2.48 (1.22)	**-0.071**	**-0.168**	**0.921**	

[a] Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Table 65

Factor Analysis and Reliability Test: "Place Dependence" of the Full Sample

Variable Symbols	Measured variable	*N*	Mean (*S.D.*)	Factor Loading[a]	Corrected item-total correlation	Cronbach's Alpha if item deleted	Cronbach's Alpha
							0.829
p1	"My neighborhood is the best place for what I like to do."	119	3.14 (1.27)	0.828	0.679	0.784	
p2	"No other place can compare to my neighborhood."	118	2.63 (1.21)	0.863	0.761	0.766	
p3	"I get more satisfaction out of visiting my neighborhood than any other."	118	2.69 (1.21)	0.900	0.806	0.756	
p4	"Doing what I do at my neighborhood is more important to me than doing it in any other place."	119	2.81 (1.20)	0.881	0.767	0.765	
p5	"I wouldn't substitute any other area for doing the types of things I do at my neighborhood."	119	2.47 (1.16)	0.849	0.753	0.770	
p6	"The things I do at my neighborhood I would enjoy doing just as much at a similar site." (a reverse coding item)	119	2.44 (1.18)	**-0.015**	**-0.042**	**0.915**	

[a] Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

APPENDIX C

A TEST OF CONSTRUCT VALIDITY AND RELIABILITY:

COMMUNITY ATTACHMENT

Neighborhood Cohesion between CC Users and Nonusers

The initial measurement of *neighborhood cohesion*, consisting of one 8-item factor, indicated that the internal consistency of the measure was acceptable. Cronbach's alpha for the *neighborhood cohesion* measure scores in the full sample was 0.947. Most of the items showed satisfactory internal consistency.

Table 66

Descriptive Statistics, Bivariate Tests, and Reliability Tests: "Neighborhood Cohesion"

Items	CC Users			CC Nonusers			T-test		Cronbach's Alpha if item deleted[a]
	N	Mean	S.D.	*N*	Mean	S.D.	t	Pr(|T| > |t|)	
1. "I can get what I need in this neighborhood."	77	2.73	0.82	42	2.76	0.91	0.21	0.833	0.948
2. "This neighborhood helps me fulfill my needs."	77	2.77	0.81	42	2.48	0.99	**-1.72***	0.088	0.944
3. "I feel like a member of this neighborhood."	76	2.76	0.99	42	2.52	1.04	-1.23	0.220	0.939
4. "I belong in this neighborhood."	76	2.82	0.98	42	2.48	1.02	**-1.78***	0.077	0.937
5. "I have a say about what goes on in my neighborhood."	77	2.27	1.02	42	1.74	0.96	**-2.78*****	0.006	0.944
6. "People in this neighborhood are good at influencing each another."	77	2.45	0.91	42	2.14	0.9	**-1.79***	0.076	0.940
7. "I feel connected to this neighborhood."	77	2.73	1.02	42	2.38	0.94	**-1.82***	0.071	0.934
8. "I have a good bond with others in this neighborhood."	77	2.68	1.04	42	2.33	0.95	**-1.76***	0.081	0.936
Total	77	2.66	0.82	42	2.36	0.81	**-1.92***	0.057	0.947

* p<.1, ** p<.05, *** p<.01
Measured along a 4-point scale from 1 = not at all to 4 = completely; higher scores show better neighborhood cohesion.
[a]Cronbach's alpha values based on the full sample (N=119)

Community Support between CC Users and Nonusers

The initial measure of *community support*, consisting of one 3-item factor, indicated that the internal consistency of the measure was satisfactory. Cronbach's alpha for the *community support* measure scores in the full sample was 0.842. Most of the items presented acceptable internal consistency.

Table 67

Descriptive Statistics, Bivariate Tests, and Reliability Tests: "Community Supports"

Items	CC Users			CC Nonusers			T-test		Cronbach's Alpha if item deleted[a]
	N	Mean	S.D.	*N*	Mean	S.D.	t	Pr(|T| > |t|)	
1. "I am actively involved in community issues and activities."	77	2.3	0.97	42	1.55	0.83	**-4.22*** **	< 0.001	0.797
2. "I would do my best to enhance the development of my neighborhood."	77	2.91	0.89	42	2.43	1.09	**-2.60** **	0.011	0.763
3. "I would be willing to provide financial support for the development of my community."	77	2.3	0.84	42	1.71	0.71	**-3.81*** **	< 0.001	0.782
Total	77	2.51	0.8	42	1.89	0.73	**-4.17*** **	< 0.001	0.842

* p<.1, ** p<.05, *** p<.01
Measured along a 4-point scale from 1 = not at all to 4 = completely.
Higher scores show higher levels of community support.
[a] Cronbach's alpha values based on the full sample (N=119)

Local Shopping Loyalty between CC Users and Nonusers

The initial measure of *local shopping loyalty* revealed that most of the items presented satisfactory internal consistency. Cronbach's alpha for *local shopping loyalty* measure was 0.906.

Table 68

Descriptive Statistics, Bivariate Tests, and Reliability Tests: "Local Shopping Loyalty"

Items	CC Users			CC Nonusers			T-test		Cronbach's Alpha if item deleted[b]
	N	Mean	S.D.	*N*	Mean	S.D.	t	Pr(|T| > |t|)	
1. "I shop outside my local retail area before looking to see what is offered locally." [a]	77	3.09	0.54	42	2.69	0.98	**-2.88*****	0.005	0.904
2. "I shop locally because the convenience outweighs the other advantages of shopping outside the community."	77	2.90	0.55	42	2.48	0.86	**-3.23*****	0.002	0.901
3. "I will increase my interest in local stores when more goods/services are made available through them."	76	3.04	0.66	42	2.83	0.88	-1.44	0.154	0.916
4. "I will pay slightly more for products if I can buy them locally."	77	2.87	0.64	42	2.4	0.94	**-3.21*****	0.002	0.897
5. "I shop at local stores because it is important to help my community."	77	3.13	0.61	42	2.38	0.91	**-5.34*****	< 0.001	0.886
6. "I shop locally to support the local merchants and business district."	77	3.06	0.61	42	2.36	0.93	**-4.98*****	< 0.001	0.886
7. "Shopping at local stores is an enjoyable experience."	77	3.17	0.71	42	2.62	0.88	**-3.69*****	< 0.001	0.894
8. "Because I am more familiar with local stores, I prefer shopping locally rather than out of town."	77	2.87	0.73	42	2.5	0.99	**-2.32****	0.022	0.890
9. "I shop locally even when the selection/variety of goods is poor."	77	2.08	0.72	42	1.93	0.75	-1.07	0.288	0.905
10. "I am loyal to my local shopping area."	77	2.78	0.75	42	2.33	0.87	**-2.91*****	0.004	0.886
Total	77	2.9	0.45	42	2.45	0.67	**-4.33*****	< 0.001	0.906

* p<.1, ** p<.05, *** p<.01
[a] A reverse-coded item
[b]Cronbach's alpha values based on the full sample (N=119)
Measured along a 4-point scale from 1 = not at all to 4 = completely
Higher scores show higher levels of local shopping loyalty.

APPENDIX D

A TEST OF CONSTRUCT VALIDITY AND RELIABILITY:

QUALITY OF LIFE

Physical and Material Well-Being between CC Users and Nonusers

The initial measure of *physical and material well-being* indicated that the internal consistency of the measure was satisfactory (Cronbach's alpha = 0.730).

Table 69

Descriptive Statistics, Bivariate Tests, and Reliability Tests: "Physical and Material Well-Being"

Items	CC Users			CC Nonusers			T-test		Cronbach's Alpha if item deleted[a]
	N	Mean	S.D.	*N*	Mean	S.D.	t	Pr(|T| > |t|)	
1. "Material comforts – desirable home, food, conveniences, security"	77	5.84	0.95	42	4.48	1.5	**-6.09*** **	< 0.001	
2. "Health - being physically fit and vigorous"	77	5.1	1.35	42	4.24	1.91	**-2.87*** **	0.005	
Total	77	5.47	1.01	42	4.36	1.51	**-4.81*** **	< 0.001	0.730

* p<.1, ** p<.05, *** p<.01

[a]Cronbach's alpha values based on the full sample (N=119)

Measured along a 7-point scale from 1 = terrible to 7 = delighted

Relations with Other People between CC Users and Nonusers

Cronbach's alpha value for *relations with other people* measure scores in the full sample was 0.596, marginally acceptable. Thus, there were no changes of these four items.

Table 70

Descriptive Statistics, Bivariate Tests, and Reliability Tests: "Relations with Other People"

Items	CC Users			CC Nonusers			T-test		Cronbach's Alpha if item deleted[a]
	N	Mean	S.D.	*N*	Mean	S.D.	t	Pr(|T| > |t|)	
1. "Relationships with parents, siblings & other relatives-communicating, visiting, helping"	77	5.43	1.45	42	4.43	1.5	**-3.56*** **	0.001	0.549
2. "Having and rearing children"	71	5.72	1.54	19	5.95	1.13	0.60	0.547	0.581
3. "Close relationships with spouse or significant other"	75	6.03	1.47	41	4.93	1.79	**-3.56*** **	0.001	0.503
4. "Close friends - sharing views, interests, activities"	77	5.92	1.07	42	4.69	1.77	**-4.72*** **	< 0.001	0.461
Total	77	5.75	0.97	42	4.82	1.22	**-4.54*** **	< 0.001	0.596

* p<.1, ** p<.05, *** p<.01

[a]Cronbach's alpha values based on the full sample (N=119)

Measured along a 7-point scale from 1 = terrible to 7 = delighted

Social, Community, and Civic activities between CC Users and Nonusers

Both items on *social, community, and civic activities* (helping others and participation in organizations) had significantly higher ratings among CC users (Table 71). Cronbach's alpha value for the initial measure of *social, community, and civic activities* was 0.878, which indicates that the test is reliable.

Table 71

Descriptive Statistics, Bivariate Tests, and Reliability Tests: "Social, Community, and Civic activities"

Items	CC Users			CC Non-Users			T-test		Cronbach's Alpha if item deleted[a]
	N	Mean	S.D.	*N*	Mean	S.D.	T	Pr(|T| > |t|)	
1. "Helping and encouraging others, volunteering, giving advice"	76	5.97	0.94	42	4.55	1.47	**-6.43*** **	< 0.001	
2. "Participating in organizations and public affairs"	76	5.55	1.09	42	4	1.5	**-6.47*** **	< 0.001	
Total	76	5.76	0.93	42	4.27	1.38	**-6.98*** **	< 0.001	0.878

* p<.1, ** p<.05, *** p<.01
[a]Cronbach's alpha values based on the full sample (N=119)
Measured along a 7-point scale from 1 = terrible to 7 = delighted

Personal Development and Fulfillment between CC Users and Nonusers

All scale items used to measure *personal development and fulfillment* displayed acceptable reliability coefficients (Cronbach's alpha = 0.0849).

Table 72

Descriptive Statistics, Bivariate Tests, and Reliability Tests: "Personal Development and Fulfillment"

Items	CC Users			CC Non-Users			T-test		Cronbach's Alpha if item deleted[a]
	N	Mean	S.D.	*N*	Mean	S.D.	t	Pr(|T| > |t|)	
1. "Learning - attending school, improving understanding, getting additional knowledge"	77	5.74	1.2	42	5.02	1.37	**-2.96*** **	0.004	0.784
2. "Understanding yourself and knowing your assets and limitations - knowing what life is about "	77	5.9	1.11	42	5.14	1.34	**-3.29*** **	0.001	0.776
3. "Work - job or in home "	77	5.39	1.25	42	4.29	1.73	**-4.01*** **	< 0.001	0.822
4. "Expressing yourself creatively"	77	5.7	1.1	42	4.83	1.41	**-3.71*** **	< 0.001	0.846
Total	77	5.71	0.94	42	4.84	1.2	**-4.36*** **	< 0.001	0.849

* p<.1, ** p<.05, *** p<.01

[a] Cronbach's alpha values based on the full sample (N=119)

Measured along a 7-point scale from 1 = terrible to 7 = delighted

Recreation between CC Users and Nonusers

The initial measure of *recreation* showed that most of the items presented acceptable internal consistency. Cronbach's alpha for the *recreation* measure was 0.734.

Table 73

Descriptive Statistics, Bivariate Tests, and Reliability Tests: "Recreation"

Items	CC Users			CC Non-Users			T-test		Cronbach's Alpha if item deleted[a]
	N	Mean	S.D.	*N*	Mean	S.D.	t	Pr(|T| > |t|)	
1. "Socializing - meeting other people, doing things, parties, etc."	77	5.47	1.28	42	4.52	1.78	**-3.33*** **	0.001	0.564
2. "Reading, listening to music, or watching sports, other entertainment"	77	6.21	0.94	42	5.6	1.48	**-2.76*** **	0.007	0.735
3. "Participating in active recreation"	77	5.36	1.43	42	4.64	1.57	**-2.53** **	0.013	0.610
Total	77	5.67	0.96	42	4.92	1.32	**-3.56*** **	0.001	0.734

* p<.1, ** p<.05, *** p<.01

[a] Cronbach's alpha values based on the full sample (N=119)

Measured along a 7-point scale from 1 = terrible to 7 = delighted

APPENDIX E

(PH1-1) FINAL MODEL WITHOUT MISSING IMPUTATION

The results of PH1-1 without missing imputation are similar to those with missing imputation (Table 3, p. 71) in terms of significant variables and the explanation of the total variance.

Table 74

(PH1-1) Final Model of CC Membership: Adjusted Logistic Regression

Class	Predictor	CC membership: member=1 (binary) (outcome)				
		OR	%	S.E.	β	P>|z|
Neighborhood Environment	**Objective Walkability**					
	Destination accessibility	**1.05****	4.70	0.02	0.30	0.021
	Place Dependence[a]**	**2.46****	145.40	1.06	0.26	0.036
Demographics	Female: 1(binary)	**23.79*****	1632.4	24.95	0.34	0.003
	Age	**1.09****	8.90	0.04	0.32	0.011
	White: 1(binary)	0.98	-18.50	1.24	-0.02	0.987
	Currently married: 1 (binary)	**7.48****	507.10	6.41	0.25	0.019
	Currently working: 1(binary)	0.30	-54.00	0.27	-0.10	0.181
	Household income	0.74	-24.50	0.30	-0.09	0.453
	Home owner: 1(binary)	1.62	46.70	1.62	0.05	0.629
	Single family housing: 1(binary)	**7.70***	542.50	8.96	0.23	0.079
	Car owner: 1(binary)	**16.55****	1087.7	22.03	0.25	0.035
	Metropolitan area: 1(binary)	**0.02*****	-97.80	0.02	-0.47	< 0.001
N			108			
LR chi2 (12)			81.46			
Prob > chi2			< 0.001			
McFadden's Pseudo R2			0.5681			

Non-significant variables were excluded except for the theoretically significant variable (working status).
* p<.1, ** p<.05, *** p<.01
[a] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree.
% is percent change in odds for unit increase in X.
β is fully standardized coefficient.
McFadden's Pseudo R2 was used for the model fit.

APPENDIX F

RESPONDENT CHARACTERISTICS:

REASON TO CHOOSE THE NEIGHBORHOOD

Both CC users and nonusers considered affordable housing or housing price as the first reason to choose their current neighborhood (Table 75).

Table 75

Reason to Choose the Neighborhood

Items	Full	CC Users	CC Nonusers
	***N* (%)**	***N* (%)**	***N* (%)**
1. Affordable housing or housing price	67 (18.5%)	44 (17.1%)	23 (21.9%)
2. Neighborhood safety	54 (14.9%)	39 (15.2%)	15 (14.3%)
3. To be close to work and/or school	47 (13.0%)	34 (13.2%)	13 (12.4%)
4. To be close to family members, relatives and/or friends	44 (12.2%)	30 (11.7%)	14 (13.3%)
5. Quality and attractiveness of the neighborhood	44 (12.25)	33 (12.8%)	11 (10.5%)
6. Ease of walking to retail and services	26 (7.2%)	19 (7.4%)	7 (6.7%)
7. Prestigious schools	24 (6.6%)	17 (6.6%)	7 (6.7%)
8. Friendly neighbors	16 (4.4%)	12 (4.7%)	4 (3.8%)
9. Ease of walking to transit	8 (2.2%)	3 (1.2%)	5 (4.8%)
10. Availability of Community Currency program	7 (1.9%)	7 (2.7%)	-
11. Others	25 (6.9%)	19 (7.4%)	6 (5.7%)

Others: wooded back yard, diversity of community, accessible housing, lake access/parks/trails/orchards, Rural area(lake view, environmental positives, woods, fields, animals, sky), convenient for out of state travel, beautiful historic neighborhood with old homes, convenient access to highways, etc.

APPENDIX G

RESPONDENT CHARACTERISTICS:

CURRENT OCCUPATION

The most common occupations among CC users were education, training, and library related jobs (11.84%), while food preparation and serving related jobs (11.90%) were most common among nonusers (Table 76).

Table 76

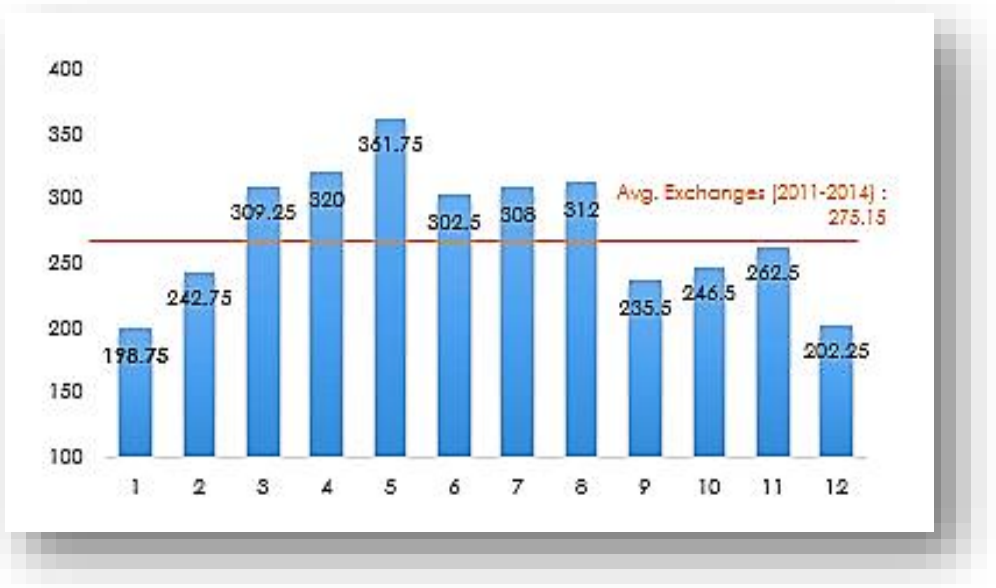
Current Occupation

Occupations	CC Users (*N*=76)	CC Non-Users (*N*=42)	Full (*N*=118)
	N (%)	*N* (%)	*N* (%)
1. Architecture and engineering occupations	-	-	-
2. Arts, design, entertainment, sports, and media occupations	5 (6.58%)	4 (9.52%)	9 (7.63%)
3. Building and grounds cleaning and maintenance occupations	-	-	-
4. Business and financial operations occupations		3 (7.14%)	3 (2.54%)
5. Community and social service occupations	5 (6.58%)	1 (2.38%)	6 (5.08%)
6. Computer and mathematical occupations	1 (1.32%)	2 (4.76%)	3 (2.54%)
7. Construction and extraction occupations	-	-	-
8. Education, training, and library occupations	9 (11.84%)	3 (7.14%)	12 (10.17%)
9. Farming, fishing, and forestry occupations	2 (2.63%)	-	2 (1.69%)
10. Food preparation and serving related occupations	2 (2.63%)	5 (11.90%)	7 (5.93%)
11. Healthcare practitioners and technical occupations	3 (3.95%)	2 (4.76%)	5 (4.24%)
12. Healthcare support occupations	3 (3.95%)	2 (4.76%)	5 (4.24%)
13. Installation, maintenance, and repair occupations	-	1 (2.38%)	1 (0.85%)
14. Legal occupations	1 (1.32%)	-	1 (0.85%)
15. Life, physical, and social science occupations	2 (2.63%)	-	2 (1.69%)
16. Management occupations	4 (5.26%)	-	4 (3.39%)
17. Office and administrative support occupations	3 (3.95%)	-	3 (2.54%)
18. Personal care and service occupations	2 (2.63%)	-	2 (1.69%)
19. Production occupations	2 (2.63%)	-	2 (1.69%)
20. Protective service occupations	-	2 (4.76%)	2 (1.69%)
21. Sales and related occupations	5 (6.58%)	4 (9.52%)	9 (7.63%)
22. Transportation and materials moving occupations	1 (1.32%)	-	1 (0.85%)
23. Others	26 (34.21%)	13 (30.95%)	39 (33.05%)

APPENDIX H

AVERAGE MONTHLY EXCHANGES OF

THE CROOKED RIVER ALLIANCE OF TIMEBANKS



Source: the Crooked River Alliance of TimeBanks (CRAT)

Figure 6

Average Monthly Exchanges of the Crooked River Alliance of TimeBanks (CRAT) (2011-2014)

APPENDIX I

BIVARRIATE TESTS: CC ACTIVITIES

Table 77

Participation in CC Events

CC activities and satisfaction	Participation in CC events						T-test	
	Once a month or more =1			Less than once a month= 0				
	N	Mean	S.D.	*N*	Mean	S.D.	t	P>|t|
1. Length of Participation	36	2.07	1.62	40	2.23	1.39	0.46	0.647
2. Time credits (TC) to use for obtaining services	37	**31.86**	48.82	38	9.47	11.83	-2.75	**0.008**
2-1. TC to use for obtaining services available on the market	37	**28.14**	40.78	38	6.93	9.99	-3.11	**0.003**
2-2. TC to use for obtaining services not available on the market	35	**5.89**	10.44	38	2.34	7.29	-1.69	**0.095**
3. Time credits (TC) to receive for providing services	36	19.72	29.32	36	19.72	29.32	-1.44	0.154
3-1. TC to receive for offering services available on the market	37	**17.11**	28.31	37	7.48	17.54	-1.76	**0.083**
3-2. TC to receive for offering services not available on the market	36	60.17	219.92	37	11.32	19.96	-1.35	0.183
4. Time credits (TC) to receive for giving goods	30	9.91	11.00	33	7.25	20.95	-0.62	0.537
5. Time credits (TC) to use for obtaining goods	31	**11.65**	18.95	33	4.70	4.69	-2.04	**0.045**
6. Social satisfaction with CC	37	**4.32**	0.81	40	3.75	0.74	-3.23	**0.002**
7. Economic satisfaction with CC	37	4.14	0.92	40	3.86	0.86	-1.38	0.172

Table 78

Number of Kinds of Goods and Services

CC activities and satisfaction	Number of kinds of goods and services						T-test	
	3 or more per month =1			Less than 3 per month= 0				
	N	Mean	S.D.	*N*	Mean	S.D.	t	P>|t|
1. Length of Participation	37	2.03	1.49	39	2.28	1.51	0.74	0.462
2. Time credits (TC) to use for obtaining services	37	**31.34**	48.11	38	9.97	15.16	-2.61	**0.011**
2-1. TC to use for obtaining services available on the market	37	**25.81**	40.42	38	9.20	14.70	-2.38	**0.020**
2-2. TC to use for obtaining services not available on the market	36	5.51	11.55	37	2.61	5.49	-1.38	0.172
3. Time credits (TC) to receive for providing services	36	73.56	217.68	37	19.61	35.63	-1.49	0.141
3-1. TC to receive for offering services available on the market	36	**18.68**	30.70	38	6.24	12.51	-2.30	**0.024**
3-2. TC to receive for offering services not available on the market	35	59.87	221.61	38	12.88	33.18	-1.29	0.200
4. Time credits (TC) to receive for giving goods	33	**12.69**	22.02	30	3.93	5.70	-2.12	**0.039**
5. Time credits (TC) to use for obtaining goods	32	**12.77**	18.15	32	3.36	4.47	-2.85	**0.006**
6. Social satisfaction with CC	37	**4.25**	0.76	40	3.81	0.83	-2.43	**0.018**
7. Economic satisfaction with CC	37	**4.33**	0.69	40	3.69	0.95	-3.37	**0.001**

Table 79

Average Number of Exchanges

CC activities and satisfaction	Average number of exchanges						T-test	
	3 or more per month =1			Less than 3 per month= 0				
	N	Mean	S.D.	*N*	Mean	S.D.	t	P>|t|
1. Length of Participation	32	2.47	1.54	44	1.93	1.44	-1.55	0.126
2. Time credits (TC) to use for obtaining services	32	**39.01**	50.56	43	6.75	6.98	-4.14	**< 0.001**
2-1. TC to use for obtaining services available on the market	32	**32.26**	42.86	43	6.33	8.01	-3.89	**< 0.001**
2-2. TC to use for obtaining services not available on the market	30	**7.40**	12.63	43	1.70	4.10	-2.77	**0.007**
3. Time credits (TC) to receive for providing services	31	**92.74**	233.19	42	11.87	15.16	-2.25	**0.028**
3-1. TC to receive for offering services available on the market	31	**20.92**	31.82	43	6.08	13.19	-2.75	**0.008**
3-2. TC to receive for offering services not available on the market	30	**75.68**	239.57	43	7.31	9.28	-1.88	**0.065**
4. Time credits (TC) to receive for giving goods	28	**13.81**	23.57	35	4.28	6.06	-2.30	**0.025**
5. Time credits (TC) to use for obtaining goods	28	**13.09**	18.91	36	4.15	6.17	-2.66	**0.010**
6. Social satisfaction with CC	32	**4.42**	0.62	45	3.74	0.84	-3.85	**< 0.001**
7. Economic satisfaction with CC	32	**4.40**	0.63	45	3.71	0.95	-3.57	**0.001**

Table 80

Number of Trading Partners

CC activities and satisfaction	Number of trading partners						T-test	
	3 or more per month =1			Less than 3 per month= 0				
	N	**Mean**	**S.D.**	***N***	**Mean**	**S.D.**	**t**	**P>|t|**
1. Length of Participation	28	2.39	1.44	48	2.02	1.52	-1.03	0.304
2. Time credits (TC) to use for obtaining services	29	**34.90**	40.65	46	11.45	31.38	-2.81	**0.006**
2-1. TC to use for obtaining services available on the market	29	**30.34**	38.29	46	9.23	22.61	-3.00	**0.004**
2-2. TC to use for obtaining services not available on the market	27	**6.35**	9.97	46	2.68	8.29	-1.69	**0.095**
3. Time credits (TC) to receive for providing services	28	51.04	49.44	45	43.21	196.00	-0.21	0.837
3-1. TC to receive for offering services available on the market	28	**21.02**	31.46	46	6.98	15.98	-2.54	**0.013**
3-2. TC to receive for offering services not available on the market	27	33.46	45.86	46	36.55	194.13	0.08	0.936
4. Time credits (TC) to receive for giving goods	24	**14.78**	25.04	39	4.66	6.72	-2.40	**0.020**
5. Time credits (TC) to use for obtaining goods	24	**11.83**	14.85	40	5.80	13.04	-1.70	**0.094**
6. Social satisfaction with CC	29	**4.27**	0.88	48	3.87	0.76	-2.13	**0.037**
7. Economic satisfaction with CC	29	**4.33**	0.87	48	3.80	0.86	-2.62	**0.011**

Table 81

CC Account Balance

CC activities and satisfaction	CC account balance						T-test	
	Balanced (-20 ~ +20)= 1			Unbalanced (Others)= 0				
	N	Mean	S.D.	*N*	Mean	S.D.	t	P>|t|
1. Length of Participation	46	1.90	1.40	30	2.56	1.56	1.93	0.057
2. Time credits (TC) to use for obtaining services	45	6.88	7.79	30	**40.97**	51.46	4.38	**< 0.001**
2-1. TC to use for obtaining services available on the market	45	5.87	7.09	30	**34.68**	43.48	4.37	**< 0.001**
2-2. TC to use for obtaining services not available on the market	45	2.03	4.60	28	**7.27**	12.91	2.49	**0.015**
3. Time credits (TC) to receive for providing services	44	9.07	8.03	29	**102.57**	239.18	2.60	**0.011**
3-1. TC to receive for offering services available on the market	45	3.97	7.18	29	**25.22**	33.50	4.13	**< 0.001**
3-2. TC to receive for offering services not available on the market	45	6.81	7.76	28	**81.37**	247.36	2.03	**0.046**
4. Time credits (TC) to receive for giving goods	37	4.07	5.68	26	**14.85**	24.27	2.61	**0.011**
5. Time credits (TC) to use for obtaining goods	38	3.49	4.07	26	**14.75**	19.68	3.44	**0.001**
6. Social satisfaction with CC	47	3.79	0.85	30	**4.38**	0.64	3.24	**0.002**
7. Economic satisfaction with CC	47	3.79	0.95	30	**4.32**	0.69	2.60	**0.011**

APPENDIX J

BIVARIATE ANALYSIS: CC ACTIVITIES AND SATISFACTION

To examine the relationship among CC activity variables, a bivariate analysis was conducted using the Pearson's correlation coefficient between continuous variables (Table 82). *Length of participation* had significantly positive correlations with *time credits (TC) to use for obtaining services* (r =0.4459), *TC to use for obtaining services available on the market* (r = 0.3988), *TC to use for obtaining services not available on the market* (r =0.4757), *TC to receive for providing services*(r =0.3876), *TC to receive for offering services available on the market* (r =0.2449), *TC to receive for offering services not available on the market* (r =0.364), and *TC to use for obtaining goods*(r =0.3628).

TC to use for obtaining services had significantly positive correlations with *TC to receive for providing services* (r =0.7402), *TC to use for obtaining goods* (r=0.6421), *social satisfaction with CC* (r =0.2265), and *economic satisfaction with CC* (r =0.1963). *TC to receive for providing services* had significantly positive associations with *TC to receive for giving goods* (r =0.3426) and *TC to use for obtaining goods* (r =0.6983). *TC to receive for giving goods* had a significantly positive correlation with *TC to use for obtaining goods* (r =0.3864). *TC to use for obtaining goods* had a significantly positive association with *economic satisfaction with CC* (r =0.2829).

Social satisfaction with CC had a strong positive relationship with *economic satisfaction with CC* (r = 0.6908). Also, it had significantly positive correlations with

TC to use for obtaining services available on the market (r = 0.2300) and *TC to receive for offering services available on the market* (r =0.2605). *Economic satisfaction with CC* had significantly positive associations with *TC to receive for offering services available on the market* (r =0.2057) and *TC to use for obtaining goods* (r =0.2829).

Table 82

Correlations among CC Activities and Satisfaction

CC activities and satisfaction	1	2	2-1	2-2	3	3-1	3-2	4	5	6	7
1. Length of Participation	1.0000										
2. Time credits (TC) to use for obtaining services	**0.4459*** **	1.0000									
2-1. TC to use for obtaining services available on the market	**0.3988*** **	**0.9661*** **	1.0000								
2-2. TC to use for obtaining services not available on the market	**0.4757*** **	**0.6179*** **	**0.4418*** **	1.0000							
3. Time credits (TC) to receive for providing services	**0.3876*** **	**0.7402*** **	**0.6374*** **	**0.6674*** **	1.0000						
3-1. TC to receive for offering services available on the market	**0.2449** **	**0.5072*** **	**0.4994*** **	**0.3507*** **	0.0794	1.0000					
3-2. TC to receive for offering services not available on the market	**0.3647*** **	**0.6912*** **	**0.5877*** **	**0.6474*** **	**0.9896*** **	0.0063	1.0000				
4. Time credits (TC) to receive for giving goods	0.168	0.1925	0.191	0.1297	**0.3426*** **	**0.2397***	**0.2826** **	1.0000			
5. Time credits (TC) to use for obtaining goods	**0.3628*** **	**0.6421*** **	**0.5914*** **	**0.4356*** **	**0.6983*** **	0.191	**0.6535*** **	**0.3864*** **	1.0000		
6. Social satisfaction with CC	0.058	**0.2265***	**0.2300** **	0.1283	0.1791	**0.2605** **	0.1668	-0.0021	0.1962	1.0000	
7. Economic Satisfaction with CC	0.129	**0.1963***	0.187	0.1809	0.164	**0.2057***	0.1462	0.0532	**0.2829** **	**0.6908*** **	1.0000

* p<.1, ** p<.05, *** p<.01

APPENDIX K

BIVARIATE ANALYSIS: NEIGHBORHOOD ENVIRONMENTS

To examine the relationship among neighborhood environment variables, a bivariate analysis was conducted using the Pearson's correlation coefficient. *Destination accessibility*, the objective neighborhood environment, had a significantly positive correlation with perceived *access to services* in all three groups (the full sample, r = 0.5559; CC users, r = 0.6479; and nonusers, r = 0.2777); and *comforts in walking:* the full sample (r = 0.4500), CC users (r = 0.4964), and nonusers (r = 0.3264). However, *destination accessibility* had a significantly negative relationship with *crime safety* in the full sample and nonuser group (r = -0.2203 and -0.3374, respectively). *Access to services* had significantly positive associations with *comforts in walking* in all three groups (the full sample, r = 0.5311; CC users, r =0.5234; and nonusers, r = 0.5231, at the 0.1 or better level of significance) and *place dependence* in all three groups (the full sample, r= 0.2456; CC users, r =0.3060; and nonusers, r =0.2784). Also, it had statistical significance and moderately positive relationships with *number of social activity places* (r = 0.2113 and 0.2346, respectively) and *frequency of social activity places* (r = 0.1869 and 0.2115, respectively) in both the full sample and CC users. *Comforts in walking* had statistical significance and a moderately positive relationship with *place dependence (*r= 0.2843 and 0.3648, respectively) in both the full sample and CC users. *Crime safety* had statistical significance and moderately positive relationships with *place dependence (*r= 0.2438 and 0.3666, respectively), *number of social activity places* (r = 0.1750 and

0.2845, respectively) and *frequency of social activity places* (r = 0.2084 and 0.3388, respectively) in both the full sample and nonusers. *Place dependence* had statistical significance and a moderately positive relationship with *number of social activity places* in all three samples (the full sample, r = 0.3631; CC users, r = 0.4046; and nonusers, r = 0.3028, respectively). Moreover, it was statistically significant and moderately correlated with *frequency of social activity places* (r = 0.2409 and 0.2171) in both the full sample and CC users. *Number of social activity places* had a significantly strong positive relationship with *frequency of social activity places* in all three samples (the full sample, r = 0.6964; CC users, r = 0.6541; and nonusers, r = 0.7705, respectively).

Table 83

Correlations among Neighborhood Environment Measures: Full Sample

Neighborhood Environment	N	Mean	S.D.	Range	1	2	3	4	5	6	7
1. Destination accessibility	113	32.68	23.95	(0 - 89)	1.000						
2. Access to services	119	3.49	1.32	(1 - 5)	**0.5559*** **	1.000					
3. Comforts in walking	119	3.00	1.16	(1 - 5)	**0.4500*** **	**0.5311*** **	1.000				
4. Crime safety	119	4.39	0.84	(1 - 5)	**-0.2203** **	-0.0334	-0.0456	1.000			
5. Place dependence	119	2.77	1.05	(1 - 5)	0.0125	**0.2456*** **	**0.2843*** **	**0.2438*** **	1.000		
6. Number of social activity places	118	1.86	1.28	(0 - 5)	-0.0566	**0.2113** **	0.0628	**0.1750***	**0.3631*** **	1.000	
7. Frequency of social activity places	118	1.61	1.13	(0 - 5)	-0.045	**0.1869** **	0.0012	**0.2084** **	**0.2409*** **	**0.6964*** **	1.000

* p<.1, ** p<.05, *** p<.01

Table 84

Correlations among Neighborhood Environment Measures: CC Users

Neighborhood Environment	N	Mean	S.D.	Range	1	2	3	4	5	6	7
1. Destination accessibility	71	30.68	25.47	(0 - 89)	1.000						
2. Access to services	77	3.33	1.41	(1 - 5)	**0.6479*** **	1.000					
3. Comforts in walking	77	2.88	1.17	(1 - 5)	**0.4964*** **	**0.5234*** **	1.000				
4. Crime safety	77	4.55	0.62	(2 - 5)	-0.1131	-0.0437	-0.0918	1.000			
5. Place dependence	77	2.95	1.06	(1 - 5)	0.0829	**0.3060*** **	**0.3648*** **	0.0712	1.000		
6. Number of social activity places	76	1.88	1.24	(0 - 5)	-0.0332	**0.2346** **	-0.0139	0.0695	**0.4046*** **	1.000	
7. Frequency of social activity places	76	1.68	1.13	(0 - 5)	0.0451	**0.2115* **	-0.0822	0.0704	**0.2171* **	**0.6541*** **	1.000

* p<.1, ** p<.05, *** p<.01

Table 85

Correlations among Neighborhood Environment Measures: Nonusers

Neighborhood Environment	N	Mean	S.D.	Range	1	2	3	4	5	6	7
1. Destination accessibility	42	36.05	21.00	(2 - 79)	1.000						
2. Access to services	42	3.79	1.07	(1 - 5)	**0.2777* **	1.000					
3. Comforts in walking	42	3.21	1.11	(1 - 5)	**0.3264** **	**0.5231*** **	1.000				
4. Crime safety	42	4.10	1.07	(1 - 5)	**-0.3374** **	0.0896	0.081	1.000			
5. Place dependence	42	2.43	0.93	(1- 4.6)	-0.0716	**0.2784* **	0.2528	**0.3666** **	1.000		
6. Number of social activity places	42	1.81	1.37	(0 - 5)	-0.0915	0.1941	0.2098	**0.2845* **	**0.3028* **	1.000	
7. Frequency of social activity places	42	1.48	1.13	(0 - 5)	-0.1991	0.194	0.1977	**0.3388** **	0.2501	**0.7705*** **	1.000

* p<.1, ** p<.05, *** p<.01

APPENDIX L

(PH2) FINAL MODEL WITH LOWER LEVELS OF CC AMOUNTS

Table 86

(PH2) Final Model of Community Attachment among CC Users: Adjusted Regression with Robust Standard Errors†

Class	Predictor	Outcome 1 Neighborhood Cohesion[a]			Outcome 2 Community Support[a]			Outcome 3 Local Shopping Loyalty[a]		
		b	β	P>|t|	b	β	P>|t|	b	β	P>|t|
CC Activities and Satisfaction	TC to use for obtaining services available on the market	**-0.01***	-0.34	0.06	**-0.009****	-0.36	0.01	**-0.01*****	-0.56	< 0.001
	TC to use for obtaining services not available on the market	0.01	0.15	0.466	**0.03***	0.31	0.064	0.01	0.21	0.189
	TC to receive for providing services available on the market	0.005	0.14	0.366	-0.002	-0.04	0.785	0.002	0.12	0.386
	TC to receive for providing services not available on the market	0.001	0.20	0.212	-0.0005	-0.09	0.548	0.001	0.20	0.164
	Social satisfaction with CC[c]	**0.36****	0.36	0.039	0.09	0.09	0.609	**0.16***	0.29	0.074
	Economic satisfaction with CC[c]	-0.06	-0.06	0.718	0.21	0.24	0.207	0.01	0.02	0.884
Demographics	Age	-0.01	-0.21	0.121	-0.003	-0.04	0.752	-0.01	-0.15	0.236
	White: 1(binary)	-0.02	-0.01	0.938	0.02	0.01	0.961	**0.29****	0.16	0.014
	College graduate or more: 1(binary)	**-0.34***	-0.20	0.099	**-0.34***	-0.20	0.079	**-0.21****	-0.23	0.044
	Children in household (<18yrs): 1(binary)	0.20	0.12	0.349	-0.10	-0.06	0.663	0.05	0.05	0.663
	Home owner: 1(binary)	-0.13	-0.07	0.565	-0.17	-0.09	0.45	0.01	0.01	0.958
	Length of residency	**0.02***	0.22	0.084	**0.03*****	0.40	0.004	**0.01****	0.33	0.017
	Population density	0.0002	0.17	0.126	0.00003	0.03	0.82	0.00004	0.05	0.633
N			77			77			77	
F(13, 63)			3.67			3.00			5.66	
Prob > F			**0.0002**			**0.0018**			**< 0.001**	
R-squared			0.3489			0.2610			0.3507	

Non-significant variables were excluded except for the several theoretically significant variables.

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 4-point scale from 1 = not at all to 4 = completely

[b] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree

APPENDIX M

(PH3) FINAL MODEL WITH LOWER LEVELS OF CC AMOUNTS

Table 87

(PH3) Final Model of Quality of Life among CC Users: Adjusted Regression with Robust Standard Errors

Class	Predictors	Outcome 1: Physical and Material Well-Being[a]			Outcome 2: Relations with Other People[a]			Outcome 3: Social, Community, and Civic activities[a]			Outcome 4: Personal Development and Fulfillment[a]			Outcome 5: Recreation[a]		
		b	β	P>|t|	b	β	P>|t|	B	β	P>|t|	b	β	P>|t|	b	β	P>|t|
CC Activities and Satisfaction	TC to use for obtaining services not available on the market	-0.001	-0.01	0.913	0.007	0.07	0.638	0.01	0.13	0.335	-0.0001	-0.001	0.99	0.02	0.19	0.235
	TC to receive for offering services not available on the market	-9.1E-05	-0.01	0.853	-0.0004	-0.07	0.469	-0.0001	-0.03	0.724	-0.0005	-0.07	0.337	-0.0008	-0.12	0.204
	Social satisfaction with CC[b]	0.23	0.19	0.130	0.22	0.19	0.175	**0.36****	0.32	0.027	**0.23****	0.20	0.026	0.20	0.17	0.194
	Length of CC membership	**0.17***	0.25	0.050	0.11	0.16	0.252	0.03	0.05	0.726	**0.12**	0.19	0.106	0.06	0.09	0.564
Demographics	Age	0.006	0.07	0.563	-0.01	-0.08	0.616	0.01	0.10	0.383	**0.02***	0.20	0.058	0.005	0.06	0.57
	Currently married: 1(binary)	-0.10	-0.05	0.711	0.16	0.08	0.531	-0.36	-0.18	0.154	-0.32	-0.16	0.145	-0.02	-0.01	0.937
	Household income	**0.24****	0.30	0.016	0.07	0.09	0.583	0.07	0.10	0.48	0.09	0.12	0.421	0.14	0.18	0.24
	Home owner: 1(binary)	-0.07	-0.03	0.841	-0.18	-0.08	0.644	-0.47	-0.22	0.14	**-0.77****	-0.36	0.01	**-0.66***	-0.30	0.062
	Car owner: 1(binary)	0.45	0.14	0.296	0.91	0.29	0.116	0.38	0.13	0.271	**0.97****	0.32	0.01	0.32	0.11	0.496
	Number of cars in household	0.15	0.14	0.240	0.08	0.07	0.65	0.19	0.19	0.148	**0.33****	0.32	0.013	0.24	0.22	0.135
	Metropolitan area (50,000 ≤ Pop.): 1(binary)	0.42	0.14	0.253	0.22	0.08	0.44	**0.78****	0.29	0.03	0.60	0.22	0.167	**0.71****	0.25	0.047
N			77			77			77			77			77	
F(11, 65)			7.39			3.42			6.49			5.26			5.07	
Prob > F			**< 0.001**			**< 0.001**			**< 0.001**			**< 0.001**			**< 0.001**	
R-squared			0.3097			0.2066			0.2565			0.3586			0.2050	

* p<.1, ** p<.05, *** p<.01

[a] Composite score, measured along a 7-point scale from 1 = terrible to 7 = delighted

[b] Once a month or more : 1(binary)

[c] 3+ /month : 1(binary)

[d] Composite score, measured along a 5-point scale from 1 = strongly disagree to 5 = strongly agree

APPENDIX N

SURVEY QUESTIONNAIRE

Project Title: Neighborhood Environment and Community Currency

Dear Community Currency User,

My name is Mizzo Kwon, a PhD student in the Urban and Regional Science Program in the Department of Landscape Architecture and Urban Planning at Texas A&M University. As part of my doctoral dissertation research, I am studying the relationship between neighborhood environments and community currency activities. If you agree to take part in this study, you will be asked to complete an online survey/questionnaire. This survey/questionnaire will ask about questions related to this research topic, and general sociodemographic characteristics. It will take approximately 15 minutes to complete.

It is for research purpose only. There is no risk in answering this survey. After you complete the survey, all your personal information will be removed and kept confidential. Only an ID number will be used to identify you. Also, the information collected is private and will be kept in a secure location.

Your decision to participate in this research is completely voluntary. You can skip a question if you do not want to answer it, and you may stop answering questions at any time or stop taking part in this survey.

There are no foreseeable risks for taking part in this study. There is also no direct benefit to you for participating in this study. However, your responses will help identify ways to increase residents' participation in community currency programs, and ways to improve the social and economic vitality of your community.

Your assistance in my research would be of great value to me. If you have any questions, please contact me via phone or email. Thank you in advance for your consideration.

Sincerely,

Mizzo Kwon
Ph.D. Student
Department of Landscape Architecture and Urban Planning
Texas A&M University
979.595.7313 / quo777@tamu.edu

If you are interested in participating in this survey, please click "YES" button.
[if click "YES" button, continue to the next page →]

YES **NO**

TEXAS A&M UNIVERSITY HUMAN SUBJECTS PROTECTION PROGRAM

INFORMATION SHEET FOR ONLINE SURVEY

Project Title: Neighborhood Environment and Community Currency

You are invited to take part in a research study being conducted by Mizzo Kwon, a researcher from Texas A&M University. The information in this form is provided to help you decide whether or not to take part. If you decide you do not want to participate, there will be no penalty to you, and you will not lose any benefits you normally would have.

Why Is This Study Being Done?

The purpose of this study is to investigate the relationship between neighborhood environments and community currency activities.

What Will I Be Asked To Do In This Study?

If you agree to participate in this study, you will be asked to answer questions related to this research topic, and general sociodemographic characteristics. Also, your geographic information, including home addresses will be collected for purposes of this study. Your participation in this study will last up to approximately 15 minutes.

Are There Any Risks To Me?

The things that you will be doing are no greater than risks than you would come across in everyday life.

Are There Any Benefits To Me?

There is also no direct benefit to you for participating in this study. However, your responses will help identify ways to increase residents' participation in community currency programs, and ways to improve the social and economic vitality of your community.

Will Information From This Study Be Kept Private?

The records of this study will be kept private. No identifiers linking you to this study will be included in any sort of report that might be published. Research records will be stored securely and only Dr. Yu Xiao, Dr. Chanam Lee, and Mizzo Kwon will have access to the records. Information about you will be stored in computer files protected with a password. Information about you will be kept confidential to the extent permitted or required by law. People who have access to your information include the Principal Investigators and research study personnel. Representatives of regulatory agencies such as the Office of Human Research Protections (OHRP) and entities such as the Texas A&M University Human Subjects Protection Program may access your records to make sure the study is

being run correctly and that information is collected properly. Information about you and related to this study will be kept confidential to the extent permitted or required by law.

Who may I Contact for More Information?
You may contact the Principal Investigator, Dr. Yu Xiao, to tell her about a concern or complaint about this research at 979-458-2731 or yuxiao@email.tamu.edu. You may also contact the Co-PI, Dr. Chanam Lee at 979-845-7056 or clee@arch.tamu.edu. You may also contact the Protocol Director, Mizzo Kwon at 979-595-7313 or quo777@tamu.edu.

For questions about your rights as a research participant; or if you have questions, complaints, or concerns about the research, you may contact the Texas A&M University Human Subjects Protection Program at 979.458.4067, toll-free at 1.855.795.8636, or email at irb@tamu.edu.

What if I Change My Mind About Participating?
This research is voluntary and you have the choice whether or not to be in this research study. You may decide to not begin or to stop participating at any time. If you choose not to be in this study or stop being in the study, there will be no effect on your membership. Any new information discovered about the research will be provided to you. This information could affect your willingness to continue your participation.

By completing the survey, you are giving permission for the investigator to use your information for research purposes.

By clicking "I agree" below you are indicating that you are at least 18 years old, have read and understood this consent form, and agree to participate in this research study. Please print a copy of this page for your records. Thank you.

I Agree **I Do Not Agree**

Project Title: The role of Neighborhood Environments in improving Quality of Life

Dear Resident,

My name is Mizzo Kwon, a PhD student in the Urban and Regional Science Program in the Department of Landscape Architecture and Urban Planning at Texas A&M University. As part of my doctoral dissertation research, I am conducting a survey on neighborhood environments and their roles related to community's social and economic values. If you agree to take part in this study, you will be asked to complete an online survey/questionnaire. This survey/questionnaire will ask about questions related to this research topic, and general sociodemographic characteristics. It will take approximately 15 minutes to complete.

It is for research purpose only. There is no risk in answering this survey. After you complete the survey, all your personal information will be removed and kept confidential. Only an ID number will be used to identify you. Also, the information collected is private and will be kept in a secure location.

Your decision to participate in this research is completely voluntary. You can skip a question if you do not want to answer it, and you may stop answering questions at any time or stop taking part in this survey.

There are no foreseeable risks for taking part in this study. There is also no direct benefit to you for participating in this study. However, your responses will help identify ways to improve the social and economic vitality of your community.

Your assistance in my research would be of great value to me. If you have any questions, please contact me via phone or email. Thank you in advance for your consideration.

Sincerely,

Mizzo Kwon
Ph.D. Student
Department of Landscape Architecture and Urban Planning
Texas A&M University
979.595.7313 / quo777@tamu.edu

If you are interested in participating in this survey, please click "YES" button.
[if click "YES" button, continue to the next page →]

YES **NO**

TEXAS A&M UNIVERSITY HUMAN SUBJECTS PROTECTION PROGRAM

INFORMATION SHEET FOR ONLINE SURVEY

Project Title: The role of Neighborhood Environments in improving Quality of Life

You are invited to take part in a research study being conducted by Mizzo Kwon, a researcher from Texas A&M University. The information in this form is provided to help you decide whether or not to take part. If you decide you do not want to participate, there will be no penalty to you, and you will not lose any benefits you normally would have.

Why Is This Study Being Done?
The purpose of this study is to investigate the role of neighborhood environments in improving quality of life.

What Will I Be Asked To Do In This Study?
If you agree to participate in this study, you will be asked to answer questions related to this research topic, and general sociodemographic characteristics. Also, your geographic information, including home addresses will be collected for purposes of this study. Your participation in this study will last up to approximately 15 minutes.

Are There Any Risks To Me?
The things that you will be doing are no greater than risks than you would come across in everyday life.

Are There Any Benefits To Me?
There is also no direct benefit to you for participating in this study. However, your responses will help identify ways to improve the social and economic vitality of your community.

Will Information From This Study Be Kept Private?
The records of this study will be kept private. No identifiers linking you to this study will be included in any sort of report that might be published. Research records will be stored securely and only Dr. Yu Xiao, Dr. Chanam Lee, and Mizzo Kwon will have access to the records. Information about you will be stored in computer files protected with a password. Information about you will be kept confidential to the extent permitted or required by law. People who have access to your information include the Principal Investigators and research study personnel. Representatives of regulatory agencies such as the Office of Human Research Protections (OHRP) and entities such as the Texas A&M University Human Subjects Protection Program may access your records to make sure the study is being run correctly and that information is collected properly.

Information about you and related to this study will be kept confidential to the extent permitted or required by law.

Who may I Contact for More Information?
You may contact the Principal Investigator, Dr. Yu Xiao, to tell her about a concern or complaint about this research at 979.458.2731 or yuxiao@email.tamu.edu. You may also contact the Co-PI, Dr. Chanam Lee at 979.845.7056 or clee@arch.tamu.edu. You may also contact the Protocol Director, Mizzo Kwon at 979.595.7313 or quo777@tamu.edu.

For questions about your rights as a research participant; or if you have questions, complaints, or concerns about the research, you may contact the Texas A&M University Human Subjects Protection Program at 979.458.4067, toll-free at 1.855.795.8636, or email at irb@tamu.edu.

What if I Change My Mind About Participating?
This research is voluntary and you have the choice whether or not to be in this research study. You may decide to not begin or to stop participating at any time. If you choose not to be in this study or stop being in the study, there will be no effect on you, no penalty to you, and you will not lose any benefits you normally would have. Any new information discovered about the research will be provided to you. This information could affect your willingness to continue your participation.

By completing the survey, you are giving permission for the investigator to use your information for research purposes.

By clicking "I agree" below you are indicating that you are at least 18 years old, have read and understood this consent form, and agree to participate in this research study. Please print a copy of this page for your records. Thank you.

I Agree **I Do Not**

SURVEY

SECTION A : Neighborhood Walkability

Please check the answer that best applies to your neighborhood and yourself. "Neighborhood" refers to the area within a *10-15 minute* walk from your home.

Access to services	Strongly Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Strongly Agree
Stores are within easy walking distance of my home.	☐	☐	☐	☐	☐
There are many places to go within easy walking distance of my home.	☐	☐	☐	☐	☐
It is easy to walk to a transit stop from my home.	☐	☐	☐	☐	☐

Please check the answer that best applies to your neighborhood.

Crime	Strongly Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Strongly Agree
There is a high crime rate in my neighborhood.	☐	☐	☐	☐	☐
The crime rate in my neighborhood makes it unsafe to go on walks during the day.	☐	☐	☐	☐	☐
The crime rate in my neighborhood makes it unsafe to go on walks at night.	☐	☐	☐	☐	☐

Please check the answer that best applies to your neighborhood.

Comforts and Convenience in walking and living	Strongly Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Strongly Agree
There are sidewalks on most of the streets.	☐	☐	☐	☐	☐
The sidewalks are well maintained (e.g., paved, even, and not a lot of cracks).	☐	☐	☐	☐	☐
There are enough spaces (e.g., grass strip, trees) between the sidewalks and the vehicular roadways.	☐	☐	☐	☐	☐
There are enough benches and other places to rest along the streets.	☐	☐	☐	☐	☐
There are enough trees along most of the streets.	☐	☐	☐	☐	☐
It is easy to get lost.	☐	☐	☐	☐	☐

SECTION B : Social Activity Places

Please check the answer that best applies to you.

1. **Do you have a place to visit to socialize with others *at least once a week*?**
   (e.g., restaurants, cafes, pubs, grocery stores, shops, laundry /dry cleaners, hair salons, bookstores, banks, libraries, post offices, community centers, parks, children's play areas, churches, etc.)

   ☐ Yes
   ☐ No ➔ If no, please skip this section and go directly to Section C.

2. **If yes, how many places do you visit for socialization *at least once a week*?**
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 or more places

3. **How many *times per week* in total do you visit those places?**
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 or more times per week

4. **How do you usually get there from home?**
   ☐ By walking ☐ By biking ☐ By driving ☐ By taking a bus
   ☐ Others (Please specify:)

5. **How long does it usually take for you to get there from home by your chosen transport mode above?**
   ☐ Less than 5 min. ☐ 5-10 min. ☐ 11-15 min. ☐ 16-20 min. ☐ Over 20min.

SECTION C : Place Attachment

Please check the answer that best applies to you.

Place Dependence	Strongly Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Strongly Agree
My neighborhood is the best place for what I like to do.	☐	☐	☐	☐	☐
No other place can compare to my neighborhood.	☐	☐	☐	☐	☐
I get more satisfaction out of visiting my neighborhood than any other.	☐	☐	☐	☐	☐
Doing what I do at my neighborhood is more important to me than doing it in any other place.	☐	☐	☐	☐	☐
I wouldn't substitute any other area for doing the types of things I do at my neighborhood.	☐	☐	☐	☐	☐
The things I do at my neighborhood I would enjoy doing just as much at a similar site.	☐	☐	☐	☐	☐

SECTION D : Community Currency Participation

The following questions are about your activities related to your community currency. Community currency is a medium of exchange with the purpose of connecting unmet needs with otherwise idle resources as a complement to a national currency (*e.g.*, U.S. dollar).

1. Are you aware of the community currency program?
☐ Yes
☐ No ➔ If no, please skip this section and go directly to Section E.

1-1. Have you ever participated in the community currency program?
☐ Yes ➔ Please continue.
☐ No ➔ If no, please skip this section and go directly to Section E.

1-2. Do you still participate in the program?
☐ Yes ➔ Please continue.
☐ No ➔ Please state below the reason why you are no longer participating in the program.
( )

Please answer the following questions regarding your *past/present participation* in the program.

2. How long have you been involved in the community currency program? ( ) years

3. How often did you attend community currency social events like potlucks, dances, Earth Day celebrations, etc.?
☐ More than once a month ☐ Once a month ☐ Once every two to three months
☐ Once every four to six months ☐ At least once a year ☐ Less than once a year

4. During the past year, in a typical month, how many kinds of goods and services did you exchange with community currency?
☐ 11 or more ☐ 9 to 10 ☐ 7 to 8 ☐ 5 to 6 ☐ 3 to 4 ☐ 1 to 2 ☐ 0, in some months

4-1. What types of goods and services did you exchange with community currency? Please check all that apply.
☐ Use or reuse of items ☐ Rentals of items
☐ Events and program support ☐ Health and wellness
☐ Office and administrative support ☐ Computers and technology
☐ Tutoring, consultation, and personal services
☐ Beauty and spa
☐ Construction, installation, and maintenance
☐ Cleaning, light tasks and errands ☐ Entertainment and social contact
☐ Food preparation and service ☐ Transportation and moving
☐ Arts and crafts production ☐ Others (Please specify :)

5. During the past year, in a typical month, what would you estimate as the average number of exchanges (either giving or receiving) that you did with community currency?

☐ 11 or more ☐ 9 to 10 ☐ 7 to 8 ☐ 5 to 6 ☐ 3 to 4 ☐ 1 to 2
☐ 0, in some months

6. During the past year, in a typical month, how many *trading partners* did you have?

☐ 11 or more ☐ 9 to 10 ☐ 7 to 8 ☐ 5 to 6 ☐ 3 to 4 ☐ 1 to 2
☐ 0, in some months

7. What was your last account balance in community currency?

☐ 101 or more credits ☐ 51 to 100 credits ☐ 21 to 50 credits ☐ 1 to 20 credits
☐ Balanced (no credit or debit)
☐ 1 to 20 debits ☐ 21 to 50 debits ☐ 51 to 100 debits ☐ 101 or more debits

8. During the past year, how many time credits did you *use* to *obtain services* in the timebank?

8-1. During the past year, how many time credits did you *use* to *obtain services* that you would *normally pay U.S. currency* to receive?

8-2. During the past year, how many time credits did you *use* to *obtain services* that would *NOT be available* for any amount of *U.S. currency*?

9. During the past year, how many time credits were *recorded* to your account for *services* you *provided*?

9-1. During the past year, how many time credits did you *receive* for *services* you also *offer*, or previously offered, in the market economy?

9-2. During the past year, how many time credits did you *receive* for *services* you have *NEVER* been paid in *U.S. currency* for?

10. During the past year, if you gave away goods for time credits, how many time credits did you *receive* for these *goods*?

11. During the past year, if you acquired goods for time credits, how many time credits did you *use* for these *goods*?

Please check the answer that best applies to your experience with community currency.

Social Satisfaction	Strongly Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Strongly Agree
Community currency has helped me increase my circle of friends.	☐	☐	☐	☐	☐
Community currency has helped me develop my self-confidence.	☐	☐	☐	☐	☐
Community currency has given me the ability to help people.	☐	☐	☐	☐	☐
Community currency has helped me establish relationships of trust for ongoing or future exchanges of items, goods, and services.	☐	☐	☐	☐	☐
I consciously try to go to the stores or practitioners who accept community currency.	☐	☐	☐	☐	☐
After participating in the community currency program, I am more willing to stay in the current community than before.	☐	☐	☐	☐	☐
After participating in the community currency program, I am more satisfied with my life than before.	☐	☐	☐	☐	☐

Economic Satisfaction	Strongly Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Strongly Agree
Community currency has helped me to use skills I would not have otherwise used.	☐	☐	☐	☐	☐
Community currency has given me access to goods and/or services that I would not have otherwise been able to acquire.	☐	☐	☐	☐	☐
Community currency has given me trading partners for giving my goods and/or services that I otherwise would not have had.	☐	☐	☐	☐	☐
Community currency has helped me dispose of unneeded or unused items.	☐	☐	☐	☐	☐

SECTION E : Community Attachment

The following questions are about the way that you perceive or think about your geographically localized community within your city, town, or suburb. Please check the answer that best applies to you and your community.

Neighborhood Cohesion	Not at all	Somewhat	Mostly	Completely
I can get what I need in this neighborhood.	☐	☐	☐	☐
This neighborhood helps me fulfill my needs.	☐	☐	☐	☐
I feel like a member of this neighborhood.	☐	☐	☐	☐
I belong in this neighborhood.	☐	☐	☐	☐
I have a say about what goes on in my neighborhood.	☐	☐	☐	☐
People in this neighborhood are good at influencing each another.	☐	☐	☐	☐
I feel connected to this neighborhood.	☐	☐	☐	☐
I have a good bond with others in this neighborhood.	☐	☐	☐	☐

Community Support	Not at all	Somewhat	Mostly	Completely
I am actively involved in community issues and activities.	☐	☐	☐	☐
I would do my best to enhance the development of my neighborhood.	☐	☐	☐	☐
I would be willing to provide financial support for the development of my community.	☐	☐	☐	☐

Please check the answer that best applies to your *local shopping experience*.

Convenience	Never	Occasionally	Frequently	Always
I shop outside my local retail area before looking to see what is offered locally.	☐	☐	☐	☐
I shop locally because the convenience outweighs the other advantages of shopping outside the community.	☐	☐	☐	☐
I will increase my interest in local stores when more goods/services are made available through them.	☐	☐	☐	☐

Relationship	Never	Occasionally	Frequently	Always
I will pay slightly more for products if I can buy them locally.	☐	☐	☐	☐
I shop at local stores because it is important to help my community.	☐	☐	☐	☐
I shop locally to support the local merchants and business district.	☐	☐	☐	☐
Shopping at local stores is an enjoyable experience.	☐	☐	☐	☐
Because I am more familiar with local stores, I prefer shopping locally rather than out of town.	☐	☐	☐	☐
I shop locally even when the selection/variety of goods is poor.	☐	☐	☐	☐
I am loyal to my local shopping area.	☐	☐	☐	☐

SECTION F : Quality of Life

Please read each item and check the response that best describes "*how satisfied you are*" at this time. Please answer each item even if you do not currently participate in an activity or have a relationship. You can be satisfied or dissatisfied with not doing the activity or having the relationship.

HOW SATISFIED ARE YOU WITH:

Physical and Material Well-Being	Delighted	Pleased	Mostly Satisfied	Mixed	Mostly Dissatisfied	Unhappy	Terrible
Material comforts - desirable home, food, conveniences, security	☐	☐	☐	☐	☐	☐	☐
Health - being physically fit and vigorous	☐	☐	☐	☐	☐	☐	☐

Relations with Other People	Delighted	Pleased	Mostly Satisfied	Mixed	Mostly Dissatisfied	Unhappy	Terrible
Relationships with parents, siblings & other relatives- communicating, visiting, helping	☐	☐	☐	☐	☐	☐	☐
Having and rearing children	☐	☐	☐	☐	☐	☐	☐
Close relationships with spouse or significant other	☐	☐	☐	☐	☐	☐	☐
Close friends - sharing views, interests, activities	☐	☐	☐	☐	☐	☐	☐

Social, Community, and Civic activities	Delighted	Pleased	Mostly Satisfied	Mixed	Mostly Dissatisfied	Unhappy	Terrible
Helping and encouraging others, volunteering, giving advice	☐	☐	☐	☐	☐	☐	☐
Participating in organizations and public affairs	☐	☐	☐	☐	☐	☐	☐

Personal Development and Fulfillment	Delighted	Pleased	Mostly Satisfied	Mixed	Mostly Dissatisfied	Unhappy	Terrible
Learning - attending school, improving understanding, getting additional knowledge	☐	☐	☐	☐	☐	☐	☐
Understanding yourself and knowing your assets and limitations - knowing what life is about	☐	☐	☐	☐	☐	☐	☐
Work - job or in home	☐	☐	☐	☐	☐	☐	☐
Expressing yourself creatively	☐	☐	☐	☐	☐	☐	☐

Recreation	Delighted	Pleased	Mostly Satisfied	Mixed	Mostly Dissatisfied	Unhappy	Terrible
Socializing - meeting other people, doing things, parties, etc.	☐	☐	☐	☐	☐	☐	☐
Reading, listening to music, or watching sports, other entertainment	☐	☐	☐	☐	☐	☐	☐
Participating in active recreation	☐	☐	☐	☐	☐	☐	☐

SECTION G : Demographics

1. **What is your gender?**
   - ☐ Male
   - ☐ Female

2. **In what year were you born?** _____

3. **What is the highest grade or level of school you have completed?**
   - ☐ Never attended school or only kindergarten
   - ☐ Grades 1 through 11
   - ☐ Grade 12 or GED (High school graduate)
   - ☐ College 1 year to 3 year (Some college or technical school)
   - ☐ College 4 year or more (College graduate)
   - ☐ Graduate school or more

4. **What is your race/ethnicity?**
   - ☐ White
   - ☐ Black or African American
   - ☐ Asian
   - ☐ American Indian or Alaskan Native
   - ☐ Native Hawaiian or other Pacific Islander
   - ☐ Hispanic, Latino, or Spanish origin
   - ☐ Other

5. **What is your marital status?**
   - ☐ Married
   - ☐ Widowed
   - ☐ Divorced
   - ☐ Separated
   - ☐ Single, Never Married

6. What is your current work status?

- ☐ Full-time wage and salary worker
- ☐ Part-time wage and salary worker
- ☐ Self-employed
- ☐ Unemployed, looking for work
- ☐ Unemployed, NOT looking for work
- ☐ Retired
- ☐ Disabled, not able to work
- ☐ Other (please specify):

6-1. Which of the following best describes your current occupation?

- ☐ Architecture and engineering occupations
- ☐ Arts, design, entertainment, sports, and media occupations
- ☐ Building and grounds cleaning and maintenance occupations
- ☐ Business and financial operations occupations
- ☐ Construction and extraction occupations
- ☐ Community and social service occupations
- ☐ Computer and mathematical occupations
- ☐ Education, training, and library occupations
- ☐ Farming, fishing, and forestry occupations
- ☐ Food preparation and serving related occupations
- ☐ Healthcare practitioners and technical occupations
- ☐ Healthcare support occupations
- ☐ Installation, maintenance, and repair occupations
- ☐ Legal occupations
- ☐ Life, physical, and social science occupations
- ☐ Management occupations
- ☐ Office and administrative support occupations
- ☐ Personal care and service occupations
- ☐ Production occupations
- ☐ Protective service occupations
- ☐ Sales and related occupations
- ☐ Transportation and materials moving occupations
- ☐ Other (please specify):

6-2. If employed outside home or if student, what is your primary mode of transportation for commuting to work and to your class?

- ☐ Driving alone
- ☐ Driving with others
- ☐ Walking
- ☐ Bicycling
- ☐ Using public transit
- ☐ Other (please specify):

7. How many children do you have in your household under the age of 18?

- ☐ None
- ☐ One
- ☐ Two
- ☐ Three
- ☐ Four or more

8. Which category best describes your annual household income before taxes?

- ☐ Less than $10,000
- ☐ $10,001- $15,000
- ☐ $15,001 - $25,000
- ☐ $25,001 - $35,000
- ☐ $35,001 - $50,000
- ☐ $50,001 - $75,000
- ☐ $75,001- $100,000
- ☐ $100,001 - $150,000
- ☐ $150,001 or more

9. Do you rent or own your house?

- ☐ rent
- ☐ own

10. Which best describes where you live? If you live in an apartment complex, include all apartments, units, flats, etc.

- ☐ A mobile home
- ☐ A one-family house detached from any other house
- ☐ A townhouse or townhome
- ☐ A building with 2 apartments or units
- ☐ A building with 3 or 4 apartments or units
- ☐ A building with 5 or more apartments or units
- ☐ Don’t know / Not sure

11. How long have you been in your current community? ( ) Years

12. Why did you choose to live in this community? Please check all that apply.

- ☐ Affordable housing or housing price
- ☐ Neighborhood safety
- ☐ Ease of walking to retail and services
- ☐ To be close to family members, relatives and/or friends
- ☐ To be close to work and/or school
- ☐ Quality and attractiveness of the neighborhood
- ☐ Availability of community currency program
- ☐ Friendly neighbors
- ☐ Ease of walking to transit
- ☐ Prestigious schools
- ☐ Others (Please specify:)

13. Do you have your own car? ☐ Yes ☐ No

13-1. If Yes, how many cars does your family have?

14. What is the location of your current residence? We are gathering this information to help identify additional ways of improving social and physical environments around you.

Street Address:
City:
State:
Zip Code:

14-1. If a street address is unavailable, please provide the nearest street intersection and the distance to your home.

The Nearest Intersection
Street #1:
Street #2:
Distance to your home:
City:
State:
Zip Code: